ALSEP
QUALIFICATION STATUS LIST
(QSL PACKAGE)
FLIGHT 5 CONFIGURATION

ATM 1052

Bendix

Aerospace Systems Division

NO.	REV. NO.
ATM 1052	

Qualification Status List
ALSEP Array D Configuration
(Flight 5)

DATE 15 Oct 71

In compliance with the requirements of NASA contract NASA 9-5829, this document provides a Qualification Status List (QSL) for use as Section 3 of the ALSEP Array D Acceptance Data Package (ADP).

As of the date of publication, the information herein reflects the status of qualification following the systems level tests which have been completed on the ALSEP Array D system configuration. The ALSEP Failure Analysis Reports which are possible constraints to the close out of qualification status are discussed in Section 1.2.

As of the date of publication, the information herein reflects the status of the Array D Qualification.

There are four major changes which distinguish the Array D experiment package from previously qualified systems; The Motorola Receiver, HFE installation on SP#2, The redesign of the MUX A/D converters, and the modifications of the ASE. Those components on Array D which were qualified on a component basis during the A2 program are the RSST, the BxA transmitters, and BxA Multiplexers.

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1.0 INTRODUCTION

In compliance with NASA Contract NASA 9-5829 requirements, this document provides a Qualification Status List (QSL) for use as part of the ALSEP Flight 5 Acceptance Data Package. Because this system is similar to previously qualified Systems a complete system qualification was not performed. However a partial qualification test program was performed for subpackage #2 and for items mentioned below.

The new elements that have been qualified on a component level for Array D are the MUX A/D converters and the Redundant Command Receiver. The RSST, Transmitter, and the 16 and 90 channel Multiplexers were qualified on a component basis during the Array A2, program. The ASE modifications have been verified at acceptance test levels on Array D and the HFE has been requalified on Array D. All other hardware has been qualified during the ALSEP Qual SA, Qual SB, and Qual SC Programs.

Detail changes to Array D flight hardware from the qual and ASE modification configurations are reviewed in Section 2. These differences are reflected by the appropriate pre-mod or QSD part number and revision letter to the latest part number and revision letter as implemented by each applicable CRD. These changes are mechanical in nature and do not affect the qualification status of the Array D hardware since design safety margins have been included in the design which greatly exceed flight and test requirements. Other comments concerning qualification history are provided in Section 3.0.

1.1 HARDWARE LIST FOR FLIGHT 5/ARRAY D

This list provides the qualification history and provides a comparison of the flight and qual part numbers/serial numbers for the major components of the Flight 5/Array D system. With the exception of the Motorola receiver, BxA multiplexers, BxA transmitters, the RSST, MUX A/D converters, modification to the ASE, and HFE SP2 requalification, all component qualification was performed throughout the ALSEP Qual SA, SB, and SC programs.

Array D Configuration Description
(Parts List of Major Functional Components/Subsystems)

Central Station Electronics	Qualified As:	Qual Part No.	Flt 5 Part No.
Antenna	Qual SA	2330307 S/N 4	2330307 S/N 5
Diplexer Filter	Qual SA	2330525 S/N 5	2330525 S/N 8
Diplexer Switch	Qual SA	2330526 S/N 5	2330526 S/N 7
Redundant Receiver	Component Qual Array D	2345147 S/N 14	2345147 S/N 16
Command Decoder	Qual SA Address Change Qual by Similarity	2330509 S/N 2	2330509 S/N 8
90 Channel Mux	Component Qual Array D	2345500 S/N 15	2345500 S/N 16
16 Channel Mux	Component Qual Array D	2346700 S/N 13	2346700 S/N 14
Data Processor	Qual SA Data Format Change Qual by Similarity	2330521 S/N 3	2330521 S/N 12
Transmitters	Component Qual Array A2	2345250 S/N 21, 23, 24	2345250 S/N 28, 29
Timer (RSST)	Component Qual Array A2	2338511 S/N 2	2338511 S/N 4

Central Station Electronics	Qualified As:	Qual Part No.	Flt 5 Part No.
Power Distribution Unit	Qual SA	2330450-2 S/N 4	2330450-2 S/N 11
Power Conditioning Unit	Qual SA	2330000-3 S/N 3	2330000-3 S/N 8
Wire Harness (including terminal boards) Assembly	Qual SA Array D Qual by Similarity	2331250-2 S/N 3	2345184 S/N 12
Astronaut Switch	Qual C	2335825 S/N 8	2335825 S/N 10
ASE/CSE	Qual C	2334468 S/N 5	2334468-502 S/N 6
PSE/CSE	Component Qual Array A	2334670 S/N 1	2334670 S/N 2
Thermal Plate Assembly	Qual SA	2330351-2 S/N 2	2345183 S/N 11
Thermal Bag	Qual SA	2330333 S/N 5	2330333 S/N 10
SP-1 Structural/ Thermal	**Qualified As:**	**Qual Part No.**	**Flt. Part No.**
Primary Structure	Qual SA	2334848 S/N 3	2339001 S/N 15
SP-1 Experiments	**Qualified As:**	**Qual Part No.**	**Flt. Part No.**
ASE Subsystem	Qual C	2330750-4 S/N 4	2330750-6 S/N 6
TGA	Qual C and Array D Test Program	2334772-4 S/N 5	2334772-7 S/N 6

SP-1 Experiments	Qualified As:	Qual Part No.	Flt. Part No.
MPA	Qual C and Array D Test Program	2334500-5 S/N 3	2334500-5 S/N 7
MBA	Qual C and Array D Test Program	2334499-4 S/N 7	2334499-4 S/N 8
PSE Thermal Shroud Assembly	Qual SA Array D Qual by Similarity	2334667 S/N 3 & 9	2338016 S/N 7
PSE Sensor	Qual SA Array D Qual by Similarity	2334668 S/N 2	2341604-503 S/N 8
LSM (GFE)	Qual SA Array D Qual by Similarity	2330657 S/N 2	2330657 S/N 3
SP-2 Structure	**Qualified As:**	**Qual Part No.**	**Flt 5 Part No.**
SP-2 Pallet Assembly	Qual SD	2339101 S/N 2	2339101 S/N 1
Structure Carrier Assembly	Qual SB	2338070 S/N 2	2339110 S/N 3
HFE Subpallet	Qual SD	2339130 S/N 2	2339130 S/N 5
Astromate Connector	Qual SD	2339160 S/N 3	2339160 S/N 4
Antenna Aiming Mech.	Qual SA (Mods. Qualified on SP-2 Qual D)	2339175 S/N 4	2339175 S/N 9

SP2 Structure	Qualified As:	Qual Part No.	Flt 5 Part No.
RTG (except fuel capsule)	Qual SA (GFE)	47E300779 S/N 632008	47E300779 S/N 6320012
RTG Shorting Plug	Qual by Similarity to A2. Meter Qual. by Component Test	2335520 S/N 1	2338017 S/N 8
Cask Cap Removal Tool	Qual SB	2338002 S/N 2	2338002 S/N 10
Rels. Handlg. Tool	Qual SB	2338102 S/N 1, 2	2338102 S/N 17, 18
Fuel Transfer Tool	Qual SB	2338089 S/N 2	2338089 S/N 8
Flt. Handlg. Tool (GFE)	Qual SB	47E300452 S/N 6331011	47E300452 S/N 6331009

SP 2 Experiments	Qual As:	Qual Part No.	Flt. 5 Part No.
HFE Subsystem	Qual SD	2345430 S/N 2	2345430-101 S/N 4
HFE Electronics	Qual SD	2333126 S/N 2	2333126 S/N 4
HFE Probe Package	Qual SD	2333127 S/N SQ2B	2333127 S/N F2B
HFE Emplmt. Tool	Qual SD	ADL 3711 S/N SQST	ADL 3711 S/N F2T

Item	Qualified As:	Qual Part No.	Flt 5 Part No.
Fuel Cask Assy.	Qual SA	2338660 S/N 4	2338660 S/N 8
RTG Fuel Capsule	Component Qual. (GFE)	470300400G1 S/N 6330004	470300400G1 S/N 6330005

1.2 OUTSTANDING FAILURE ANALYSIS REPORTS

The below listed FRs against Flight 5 ALSEP configuration are being processed for Failure Analysis Reporting as of the data of Publication for this QSL. All previous failure analysis reports against ALSEP Qual SA, Qual SB, Qual SC, and Flight 2A ALSEP hardware have been closed by MSC review and approval actions.

(1) FR 285, PSE Sensor S/N-3, Flight Spare

KSC reported PSE pressure below minimum during periodic checks. Analysis established that S/N-3 was acceptable as a spare in support of A2 and D test programs. Troubleshooting of the sensor caging system did not isolate any defects which would explain suspected pressure offsets or other than acceptable leakage rates. A change to specify pressure vs. time for measurements was initiated.

Status: Open

Action:
(1) Interim FAR issued on 11/25/70
(2) Interim FAR, Rev. A update 6/4/71
(3) Rev. B of the FAR issued 7/26/71
(4) Final FAR Rev. C issued 10/17/71
(5) BxA awaiting LSPO closeout action.

(2) FR A-24, PSE/CSE S/N-4, Array A-2, Flight

After PSE connector cold cycle testing at KSC, loss of channel 3 long period data was traced to the J35 connector. Array A-2 SP #1 was returned to BxA for replacement of the PSE connectors and plugs. Connector tests at BxA duplicated the KSC moisture induced failure modes on the PSE connectors.

Status: Open

Action:
(1) FR notification issued 6/14/71
(2) Interim FAR issued 6/28/71
(3) Final FAR A24A issued 7/16/71.

(4) Rev. B FAR issued 9/28/71

(5) BxA awaiting LSPO closeout action.

(3) FIAR H-GE-0131, HFE S/N-6, Array A2, Flight

Probe #2 temp. reference was downlinked as full scale high. All other downlink data was normal. BxA circuit analysis inducated that the loss of one half of an FET switch is most likely cause of failure.

Status: Open

Action: (1) FIAR provided to BxA on 8/30/71

(2) Final FIAR issued by BxA on 9/17/71

(3) BxA awaiting LSPO closeout action.

(4) FIAR H-GE-0132, Sunshield Release Cord, Array A2, Flight

During EVA-1, while deploying the ALSEP C/S on the lunar surface, the rear sunshield release cord was broken requiring manual release of the pins. CRD's have been issued to provide stronger release cords and pull tests.

Status: Open

Action: (1) FIAR provided to BxA on 8/30/71

(2) Final FIAR issued 10/4/71

(3) BxA awaiting LSPO closeout action.

(5) FIAR AA-EH-00D19, PSE/CSE S/N 2, Array D, Flight 5

Digital data anomalies occurred after rework to correct the failure documented on FIAR D17. Troubleshooting tests could not recreate the failure in either the digital nor the motherboard. The suspect boards are being replaced with new boards.

Status: Open

Action:
(1) Originally reported as problem #2 in FIAR D17

(2) Interim FIAR issued 18 June 1971

(3) Final FIAR, Rev. A, issued 25 August 1971

(4) BxA awaiting LSPO closeout action.

(6) FIAR AA-EH-00D22, C/S Bubble Level, Array D, Flight 5

Following the Array D system thermal vacuum test, the fluid was missing from the bubble level in the C/S sunshield. Replacement parts were screened by vibration and T/V tests prior to use on the central station.

Status: Open

Action:
(1) TWX notification and FIAR issued 8/25/71

(2) Final FIAR issued for BxA on 10/15/71

(3) BxA awaiting LSPO closeout action

(7) FIAR AA-EH-00D23, PSE Sensor S/N-8, Array D, Flight 5

After the start of ATP, but prior to PSE vibration, an open circuit measurement was discovered and traced to a broken eye in pin 10 of Header B. Following rework of the eye into a turrent terminal, retest verified adequacy of the fix.

Status: Open

Action:
(1) FIAR initiated by BxA on 9/1/71

(2) Interim FIAR issued on 9/13/71

(3) Final FIAR issued 9/22/71

(4) BxA awaiting LSPO closeout action.

(8) FIAR AA-EH-00D24, PSE/CSE Connector, Array D, Flight 5

During the Array D PSE/CSE interface connector verification test (PJ-30 & PJ-35) the Z tidal data went to a 5 VDC level for approximately one minute at -150°F. Vibration tests on 13, 14 September proved that the anomalies did not originate in the Sensor. The connector is being replaced to eliminate contaminant exuded from the original potting compound.

Status: Open

Action: (1) TWX notification issued 9/7/71

(2) FIAR issued 10/1/71

(3) BxA awaiting LSPO closeout action.

(9) FIAR AA-EH-00D25, ASE TGA S/N-6 Selector Switch, Flight 5

During acceptance test (Post TV) the selector switch contact resistance measurements were O/T. Further testing indicated a degrading condition. Vendor failure analysis isolated the problem to a solder defect.

Status: Open

Action: (1) TWX notification issued 9/8/71

(2) Final FIAR issued 10/1/71

(3) BxA awaiting MSC closeout action.

(10) FIAR AA-EH-00D26, LSM S/N-3, Array D, Flight 5

During Array D T/V test, the S/N-3 LSM data was not synchronous with ALSEP data format. The anomaly reoccurred during later tests at lunar noon temperatures. Subsequently, the LSM was returned to AMES for rework of an open circuit in the DC-DC converter.

Status: Open

Action: (1) TWX notification issued 9/21/71

(2) MSC to furnish FIAR analysis.

(11) FIAR AA-EH-00D27, PSE S/N-3 Sensor, Flight Spare

During troubleshooting of the PSE S/N-3 sensor caging system (FR 285, DR AB 8457) incomplete retraction of the "Y" caging pins was idscovered. Dimensional analyses of the associated bellows and installation adjustment factors are being investigated by BxA and the bellows supplier.

Status: Open

Action (1) TWX notification issued 10/15/71

(2) Interim FIAR #D 27 issued 10/15/71

(3) Final FIAR scheduled for 10/29/71 based on supplier bellows analysis by 10/22/71.

2.0 HARDWARE CHANGES

The following hardware changes were made to the Array D, Flight 5 hardware by the specified CRD action. Those changes for SP2 begin with the QSD configuration; while the changes associated with SP1 begin with the ASE prior to the modification program covered by CCP's 300 and 308. These changes in no way effect the qualification status of either SP1 or SP2.

ARRAY D, FLIGHT 5

ASE MODIFICATION CHANGE BASELINE AS OF 10-8-71

NOMENCLATURE	PRE-MOD P/N & REV.	P/N & REV. FOR CCP 300/308	CRD	REMARKS
Sub Pkg. I	2339000 S	2339000 T U	60770 60779	Add Mod Kit 2339299 (ASE Mod) Revise Thump/Geo. From 2334772-2 to -4
Cbl. Assy. M/B Ant.	2334608 -	2334608 A	60750	Increase Deployment Distance
Cbl. Assy. (W52) ASE Mortar	2333515 B	2333515 C	60764	Increase Deployment Distance
Cbl. Assy. Flat	2333530 C_2	2333530 D	60765	Increase Deployment Distance
Cbl. Spool Assy.	2330746 C_3	2330746 D	60766	Increase in Deployment Distance
Body Cbl. Spool	2330747 D_3	2330747 E	60767	Increase in Deployment Distance
Thumper/Geo. Assy.	2334772 M	2334772 N (300)	60778	Add -7 Assy.
Thumper Assy.	2331220 Y	2331220 Z (300)	60780	Add -7 Assy.
Lug Carrier Frame		2339034 A (308)	60781	Add Radi for Crew Safety
Brkt. Assy. Center Anchor		2339258 A (308)	FC 60799	Revise Mat'l Temper H24 Not Avail.
Brkt. Assy. Front Anchor		2339291 A (308)	FC 60800	Revise Mat'l Temper H24 Not Avail.
Skin-Right Panel		2369269 A (308)	FC 60801	End Holes to be Matched Drilled
ASE	2330750 -	2330750 A (308)	60802	Reflect ASE Mod
Pallet Sub Assy. End Panel		2339253 A (308)	FC 60803	Install Rivets at Next Assy.
Link Pivot Cbl. Anchor		2339235 A (308)	FC 60804	Correct Thread Callout
Link Pivot Cbl. Anchor		2339378 A (308)	FC 60805	Correct Thread Callout
Lug Carrier Frame ASE		2339034 B (308)	FC 60806	Eliminate to L. Build Up

NOMENCLATURE	PRE-MOD P/N & REV.	P/N & REV. FOR CCP 300/308	CRD	REMARKS
Spring Retainer		2369270 A (308)	FC 60807	Height Chg. to Insure Clearance at Stowage
Pallet Sub Assy. Center		2369252 A (308)	FC 60808	Clarification of Matched Drilling
Knob Sel. Sw. Thump.		2339223 A (300)	FC 60809	Correct Dwg. Error on Radius Callout
Pallet Sub Assy. Left		2369251 A (308)	FC 60810	Parallelism Added to Assure Alignment
Angle Slide Lock		2369277 A (308)	FC 60811	Hole Moved to Allow use of Univ. Hd. Rivets
Release Pin Assy.		2334037 RC1 (308)	FC 60812	New Part Added
Pedestal		2369290 A (308)	FC 60814	Revise Mat'l.
Handle		2369297 A (308)	FC 60815	Revise Mat'l.
Brkt. Assy. Center Anchor		2369258 B (308)	FC 60816	Revise Mat'l.
Brkt. Assy. Front Anchor		2369291 B (308)	FC 60817	Revise Mat'l.
Cap Fastener Guide	2334675 D	2334675 E (308)	FC 60818	New Part for ASE Pallet
Shim Pedestal		2369280 A (308)	FC 60821	New Parts Added
Receptacle Mtg. Pin		2339035 A (308)	FC 60826 A	Eliminate Interferences
Pallet Assy. Mortar Pkg.		2339380 A (308)	FC 60828	Moved Tab and Added Shim
Thumper Assy. ASE	2331220 Z	2331220 AA (300)	FC 60827	Shims Added to Eliminate Interference

NOMENCLATURE	PRE-MOD P/N & REV.	P/N & REV. FOR CCP 300/308	CRD	REMARKS
Handle, Pallet		2369297 B (308)	FC 60829	Correct Dwg. Error and Add Chamfer
Shim Pedestal		2369280 B (308)	FC 60830	Alternate Mat'l. Added for Shim
Receptacle Shear Pin		2369298 A (308)	FC 60831	Correct Hole Location
Tab Interlock		2369244 A (308)	FC 60832	Part Moved to Higher Assy. to Assure Pin Engagement
Pallet Sub Assy. Left		2369251 B (308)	FC 60833	Rivets Moved to Next Assy. Add Bond Instructions
Pallet Sub Assy. Center		2369252 B (308)	FC 60834	Add Adhesive
Pallet Sub Assy. End Panel		2369253 B (308)	FC 60835	Add Adhesive
Angle Slide Lock		2369277 B (308)	FC 60836	Add Clearance for Tol. Condition
Angle Side Support		2369246 A (308)	FC 60837	Add Clearance for Tol. Condition
Hinge Brkt. RH		2369295 A (308)	FC 60838	Add Clearance for Tol. Condition
Hinge Brkt.		2369262 A (308)	FC 60839	Add Clearance for Tol. Condition
Angle End Support		2369266 A (308)	FC 60840	Add Clearance for Tol. Condition
Receptacle Mtg. Pin		2339035 B (308)	FC 60841	Correct Dim. Elim. Interference
Knob Selector SW. Thump		2339223 B (300)	FC 60842	Increase I.D.
Staff, Bottom Section		2339239 A (308)	FC 60843	Dim. Decrease to Facilitate Stow On SPII

NOMENCLATURE	PRE-MOD P/N & REV.	P/N & REV. FOR CCP 300/308	CRD	REMARKS
Anchor Thumper Cbl.		2339230 A (308)	FC 60844	Dim. Decrease to Facilitate Stow on SPII
Head Cbl. Anchor		2339231 A (308)	FC 60845	Dim. Decrease to Facilitate Stow on SPII
Angle End		2369264 A (308)	FC 60846	Relief Added to Clear Tab
Ring Selector Knob		2331231 B (300)	FC 60832	Revise Thickness to Elim. Interference
Pedestal		2369290 B (308)	FC 60853	Bore Dia. Chg.
Ring, Detent		2339226 A (300)	FC 60854	Revise Mat'l.
Mod Kit Mortar Pkg.		2339299 A (308)	FC 60855	Dwg. Error Spacer Location Dim. Omitted
Thumper Assy. ASE	2331220	2331220 BB (300)	60859	Revised Selector Knob torque Reqmts.
Hinge Assy.		2369260 A (308)	FC 60860	Cut Spring Ends
Thump Geo.		2334772 P (300)	60867	Revise Kapton Callout
Mod Kit Mortar Pkg. Flt. 5		2339299 B (308)	60869	Revise Painting Instructions
Shim Pedestal		2369280 B2 (308)	60870	Add Shim to Next Assy.
Leg Anchor		2369256 A (308)	60871	Eliminate Interference
Locking Mechanism		2369289 A (308)	FC 60872	Spring Too Stiff for Proper Op.
Retainer Seal		2339228 A (300)	FC 60874	Design Error Revised to Meet Sw. Stop Reqmts.

NOMENCLATURE	PRE-MOD P/N & REV.	P/N & REV. FOR CCP 300/308	CRD	REMARKS
Anchor Assy. Front Leg		2339292 A (308)	FC 60876	Revise Mat'l.
Anchor Assy. Center Leg		2339257 A	FC 60877	Revise Mat'l.
Latch Assy. Rear M/B		2339286 A	FC 60878	Revise Mat'l.
Thumper		2331220 AC	FC 60879	Revise Assy. Note
Thumper		2331220 AD	FC 60880	Revise Assy. Note
Thumper Geo.		2334772 S	60884	Add Marker Ref. Nos.
Thumper		2331220 AE	60896	Chg. Paint Reqmts.
Sub Pkg. II Assy.		2339100 T	60898	Added Parts Per CCP 308
Thumper		2334772 R	FC 60900	Identify Location of Part Marking
Foam Stowage		2369236 A	FC 60901	Provide Clearance
Packing Foam Assy.		2369232 B	FC 60902	Provide Clearance
Mod Kit - MPA		2339299 C	60903	Altered Cbl. Stowage to Accomodate Excess Cbl.
Shaft Pivot		2369275 A	FC 60906	Shoulder Too Long
Pallet Assy. M/P		2339380 C	FC 60907	Add Shim & Reflect Shoulder Chg.
Foam Stowage Geoph. Stow.		2369336 B	FC 60908	Additional Relief Req'd.

NOMENCLATURE	PRE-MOD P/N & REV.	P/N & REV. FOR CCP 300/308	CRD	REMARKS
Support Strip Anchor		2369339 A	FC 60909	Smaller Strips Req'd. to Allow Anchor Removal
Packing Foam Assy. Anchor Stowage		2369232 C	FC 60910	Reduce Thickness of Teflon Film for Stowage
Pallet Assy.		2339380 D	FC 60911	Wrong Screw Callout
Sub Pkg. II Assy.		2339100 U	60912	Pictorial Chg. to Correct Pallet Picture
Hinge Brkt. R.H.		2369295 B	60913	Clearance Req'd. for Tol Condition
Mod Kit-MPA		2339299 D	60914	Provide Additional Retaining Ability
Cover Segment		2369230 A	60915	Kapton Cover Flaps Revised
Leg Anchor		2369256 B	60921	Provide Clearance
Pull Loop		2369233 A	60922	Revised to Agree with Retainer on SPII
Brkt. Guide		2369243 A	60923	Provide Clearance for M/B
Strap Anchor Stowage		2369238 A	60924	Increase Strap Width
Stud Link		2369274 A	60925	Thread Length Shortened to Eliminate Interference
Lanyard Anchor Leg Release		2369337 A	60926	Increase Strength of Lanyard
Segment Cover Assy.		2369229 A 2369233 A	60929 60930	Larger Cover Req'd to Provide Clearance
Panel Cover Anchor Stowage		2369235 B	60931	Modified to Allow Stowage of Anchors

NOMENCLATURE	PRE-MOD P/N & REV.	P/N & REV. FOR CCP 300/308	CRD	REMARKS
Pallet Assy. M/P		2339380 E	60932	Chg. Sun Compass & Reroute Release Lanyard
Sub Pkg. II Assy.		2339100 V	60933	Cover Assy. & Stow. Mode Changed to Allow Proper Mating of Cover with MPA Pallet
Anchor, Thumper Cbl.		2339230 B	60937	Eliminate Sharp Edges (Note)
*Cover, Segment		2369230 B	60944	Make Hole & Slot Dim. Relate to Chg. in Flange Dim.
Pallet Assy.		2339380 F	60948	Revise Character Template Callout
Sub Pkg. II Assy.		2339100 V2	60951	Update Top Assy. Resulting from Lower Tier Chg. i.e., Remove Pivot Pin CN 2339181 (Ref. ECP 015)
Stud Link		2369274 B	60953	Ensure Proper Engagement with Locking Feature in Nut
**Angle Brkt.		2369233 B	60954	Revise Dim. Part too Short
Pallet Assy. M/P		2339380 G	60956	Rotate Release Pins 180°
Support Hat Section		2369293 A	60957	Allow Proper Mating at Assy.
Strap Anchor Stowage		2369238 B	60958	Strap too Long for Proper Mating

NOMENCLATURE	PRE-MOD P/N & REV.	P/N & REV. FOR CCP 300/308	CRD	REMARKS
Sub Pkg. I		2339000 Y	60961	Provide Positive Attachment of Cap On Tool Guide
Thumper Assy. ASE		2331220 AF	60941	Permit Stow on TGA Without Damaging Thumper Cbl.
Link Pivot Cbl. Anchor		2339235 B	60952	Eliminate Safety HA
Sub Pkg. II Assy.		2339100 W	60964	Chg. Lanyard Location
Pallet Assy. M/P		2339380 J	60965	Add Clip
Angle Brkt.		2339233 C	60966	Reduce Length
Link Pivot Cbl. Anchor		2339235 C	60967	Add Cut Out
Strap Anchor Stowage		2339238 C	60968	Add Cut Out
Switch Rotary		2331363 D	60969	Add -101 Configuration to Eliminate Possible Degradation

NOMENCLATURE	PRE-MOD P/N & REV.	P/N & REV. FOR CCP 300/308	CRD	REMARKS
Thumper		2331220 AG	60969	**Chg. P/N of Switch**
Mod Kit MPA		2339299 E	60970	**Cbl. Stow. Revised to Reflect Chg. to Ant. Reel**
Anchor Thumper Cbl.		2339230 C	60971	**Eliminate Unnecessary Clearance**
Pallet Assy. M/P		2339380 H	60972	**Add Doublers for Pedestals**
Thumper Assy.		2331220 AH	60981	**Chg. Torque Value in Note**
Mod Kit MPA		2339299 F	60984	**Revise Stowage of Ant. Cable & Cable Reel to Insure Deployment**
Mod Kit MPA		2339299 G	60989	**Chg. Mat'l. & MIL-SPEC Callout**
Clip Pin Retainer		2369228 A	60993	**Revise Dim. for Mating**

PART NAME	QSD PART NUMBER	FLT. 5 PART NUMBER	CRD EFFECTIVITY	JUSTIFICATION
Sub. Pkg. II Assy.	2339100-2	2339100-1	-	Released Configuration to Document the use of Mass Sim. for Qual
		CRD 60679	Flt. 5	Revise guide cup cap stowage
		CRD 60386	Flt. 5	Add HFE Dust Cover - CCP 271
		CRD 67009	Flt. 5	Add HFE Probe Restraint - ECP 001
		CRD 60725	Flt. 5	CCP 295: Addition of RTG dust cover
		CRD 60745	Flt. 5	Add UHT dust caps & provide interim stowage of RTG screws CCP 297
Stowage Brkt. Astro-mate	2339181D	2339181 E	Flt. SP 2 Thr. D & E	Eliminate chafing of HFE cable during deployment (ECP 015)
HFE	2345430A	2345430 B CRD 67113	Flt. 5 A-2 Flt. 6	Add Kapton tape to eliminate chafing (ECP 015)
Pallet ASE	2339100-2	2339100-1 CRD 60898	Flt. 5	Add pallet for ASE Mod. (CCP 308)
Boyd Bolt	CA 2773	2363269 CRD 60863	Flt. 5	Provide spec control drawing to control vendor.

PART NAME	QSD PART NUMBER	FLT 5 PART NUMBER	CRD EFFECTIVITY	JUSTIFICATION
Pallet Insert Installation	2339150-2	2339150-1		Released Configuration to Document Pallet Assy. Difference
IPU Generator (GE)	476300839G1	47E300779		Simulator only needed for Qual.
Carrier Assembly	2339115	2339110		Mass Sim. only need for Qual.
Fuel Transfer Tool		2338089		Mass Sim. only needed for Qual.
Cask Dome Removal Tool		2338002		Mass Sim. only needed for Qual
Universal Handling Tool		2338102		Mass Sim. only needed for Qual
Carry Bar/Ant. Mast Upper		2338003		Mass Sim. only needed for Qual
Carry Bar/Ant. Mast Lower		2339106		Mass Sim. only needed for Qual
RTG Dust Cap		2339373		Added per CCP 295
UHT Dust Cap		2339373		Added per CCP 297

PART NAME	QSD PART NUMBER	FLT. 5 PART NUMBER	CRD EFFECTIVITY	JUSTIFICATION
PSE Stool	Not Used	2344723	-	Increased Foot Pad and Thermal Isolator Size CCP-265
Boom Attach. Release Assembly	Not Used	2335500-2	-	Previous Qualified on QSA & QSB
RTG Cable Stowage Assembly	Not Used	2339107	-	Previous Qualified on QSA & QSB
Cover Assembly Short Plug	Not Used	2335567	-	Previous Qualified on QSA & QSB
Shorting Plug Assy.	Not Used	2338017	-	Dummy RTG Used on Qual
CAP Fastener Guide	-	2334675-1	-	Parts only used on Flt. Hardware
Clamp, Boom Attach	-	2335504	-	No Boom Attachment on Qual-Part Previously Qualified
Dust Cover	-	2334528-6	-	No Shorting Plug-Part Previously Qualified
Spring Clip	-	2335516	-	No RTG Cable on Qual-Part Previously Qualified
ESNA Nut	SP1015	SP1015B	Flt. A2 and Flt. 5 Sub-Pkg. I & II	60610

PART NAME	QSD PART NUMBER	FLT. 5 PART NUMBER	CRD EFFECTIVITY	JUSTIFICATION
HFE Dust Cover	-	2339465	-	CCP-271
Retainer, PSE Stool	-	2338067	-	No PSE Stool on Qual-Part Previously Qualified
Cap, Probe Pkg.	-	2335762	-	Parts Only Used on Flt. Hardware
Velcro Pad	-	2335493-3	-	No Shorting Plug used on Qual-Part Previously Qualified
Pin	-	2335571-1	-	No Shorting Plug used on Qual - Part Previously Qualified
Pallet Assembly	2339101-2	2339101-1	-	Released Configuration to Document the Non-Usage of Boom Attachment
Boom Attachment Tube Assembly	-	2335259	-	That was Previously Qualified
Boom Yoke	-	2335258	-	That was Previously Qualified
Lock Pin Assy.	-	2335262	-	That was Previously Qualified
Boom Attach. Stud	-	2335093	-	That was Previously Qualified
Boom Attach. Nut	-	2335094	-	That was Previously Qualified

PART NAME	QSD PART NUMBER	FLT. 5 PART NUMBER	CRD EFFECTIVITY	JUSTIFICATION
HFE Sunshield Assembly	2345431B	2345431D	S/N 4, 6, & & A-2, Flt. 5 & SP	CRD 60388, 60430
Reflector	2345434	2345459	S/N 4, 6, & 7 A-2, Flt. 5 & SP	CRD 60388
Lanyard Assy.	2339090A	2339090B	Flt. A-2, Flt. 5	CRD 60576 (Add Proof Test Note for Knots) Ref. Chit A-2 S/P II CDR STC-1
Lanyard Assy.	2339091A	2339091B	Flt. A-2, Flt. 5	CRD 60576 (Add Proof Test Note for Knots) Ref. Chit A-2 S/P II CDR STC-1
HFE Probe Restraint		2339180-2A	Flt. A-2, Flt. 5	67010 - Damping Mat'l needed between HFE Probe Box and Boom Attach. to avoid Impact Loading during Vibration. Ref. ECP 001
HFE Stage 3 Assy	2334626-101B	2334626-101C	Flt. A-2 Flt. 5 & Sub Q	Chg'd part no. of probe pkg to add stripe to emplacement tool Ref. CRD 67048 & CCBD 150005
HFE Probe Pkg.	2333127	2339071	Flt. A-2, Flt. 5 & Sub Q	Addition of nominal depth mark CCB is 0005

3.0 QUAL TEST HISTORY

3.1 SUBPACKAGE #1 ASSEMBLY

Subpackage 1 was successfully qualified under the Qual SA Program. The QSL sheets provided in Appendix B for Subpackage 1 reflect the Qual SA test results except where noted on the applicable sheets or discussed herein.

3.1.1 BxA transmitters, P/N 2345250, S/N 28 and S/N 29 (on Flight 5) were qualified under the Qualification Test Program performed on the A-2 Qualification Unit Transmitter, P/N 2344600, S/N 23 and S/N 21. ATR 266 details the history of the A-2 Transmitter Qualification Test Program. The details of the qualification testing are itemized in the Appendix QSL Sheet B-8.

3.1.2 Dual 90 Channel Multiplexers and 8 Bit A/D Converters, Model 2345500, S/N 16, were qualified under the Qualification Test Ps ogram performed on S/N 15 unit. ATR 292 details the history of the Qualification Program conducted for S/N 16. The details of qualification testing are itemized in the Appendix QSL Sheet B-9.

3.1.3 Resettable Solid State Timer (RSST), S/N 004, was qualified under the Qualification Test Program performed for RSST S/N 002. The duly approved qualification test procedure covering this test is 13877-992. The details of the qualification testing are itemized in the Appendix QSL Sheet B-12.

3.1.4 16 channel ASE Multiplexer. A/D converter model 2346700, S/N 14 was qualified under the Qualification Test Program performed on the S/N 14 unit. ATR-291/BSR 3161 details the history of the qualification history conducted for S/N 16. The details of the qualification testing are itemized in Appendix QSL sheet B5.

3.1.5 Redundant Command Receiver, model 2345147, S/N 16 was qualified under the Qualification Test Program performed on S/N 14. The duly approved test procedure covering this test is 12-P11261B Revision B. The details of the qualification testing are itemized in Appendix QSL Sheet B13.

3.1.6 The ASE Experiment, 2330750-6, S/N 6, which is the flight unit for Array D was originally qualified on the Qual SC program. The ASE Experiment used in this qualification program was 2330750-4 S/N 5. The ASE modifications as covered by CCP 300 and CCP 308 do not require requalification as so stated at the MBA, SN 8 and SP#1 FTRR/FACI of 3 August 1971 (see Memo 71-9703-35). The rationale for not requalifying the ASE/Geophone Assembly is covered by Internal Memo 978-12-1214. The Qual. rationale for MBA/MBA pallet interface and effect of ASE Mods on SP#1 and SP#2 are contained in Memo 9712-633. At the FTRR/FACI ASE satellite meeting of 14 June 1971, minutes 978-12-1205, it was agreed that requalification of the ASE because of proposed changes would not be performed. It was agreed at the CARR Board meeting of 10/20/71, minutes 9712-635, that the qualification of the ASE in regards to stability would be an open item pending the results of MSC/BxA LRC evaluation team. It was also stated at this meeting that the verification of the geophone anchor design will be accomplished by ALSEP crew training exercises. The following tests were to provide the test confidence in the planned changes:

Thumper switch mod - (CCP 300):

Functional PIA
Hot temperature (selector switch and ARM/FIRE switch functional
Mass props
Vibration
T/V
Array D Integration

Mortar Box Mode - (CCP 308)

PIA
Man Props
Vibration
T/V
Array D Integration
Engineering model verification of firing environment at Langley (LRC)

The above test program has been successfully concluded. The details of the original qualification testing on Qual SC qualification program are itemized in Appendix QSL sheet B19-B21. The retest for the modification program was performed successfully as follows:

Item Tested	Test Procedure
Thumper/Geophone Functional	TP2337942C
Level A Spares Vib.	TP2338738A

Item Tested	Test Procedure
Mortar Box Assy T/V Environmental	TP2344930B
Thumper/Geophone T/V Soak	TP2344931A
Mortar Box Assy. Functional	TP2346326
Modified Mist	TP2347065A
Subpallet Vibration	TP2368917

The details of the ASE qualification testing performed on qual system SC are itemized in the Appendix QSL Sheets B-19 - B-21.

3.2 SUBPACKAGE #2 ASSEMBLY

Portions of Subpackage 2, Model 2339100-1 S/N 17 was qualified under the Qualification Test Program performed on SP #2 S/N 16 unit.

The qualification of Subpackage #2 was initially accomplished as a result of Qual SA system level tests. QSL sheets are provided in Appendix B for Subpackage #2. The major change in Subpack #2 for Array D is the structural changes to HFE and the SP #2 partial qual as stated below.

3.2.1 Heat Flow Experiment (HFE). The HFE was originally environmentally and functionally qualified as a result of system level testing on the Qual SB Subpackage #1 configuration. The requalification for Array D Flight Unit S/N04 was accomplished on the Array D SP #2 Qualification Program. HFE S/N 2 was used to qualify HFE in this qualification program. The system level parameters for this qualification are listed in Appendix B, QSL Sheet B27.

TP	ATR	SUBJECT
IST-2333034C Replay-2333034D	48	Baseline Integrated System Test
2333060A	41	System Crosstalk
2333087	33	System EMI
2337925	43	Central Station Power Dissipation
2337938	42	Mass Properties, SP #1
2337939	69	Mass Properties, SP #2
2337940	30	Acceptance Vibration, SP #1
2337941 & 2337941A	40	Acceptance Vibration, SP #2
2333034D	49	Post Vibration Integrated System Test
2333049	68	Magnetic Properties Subpackage # 1 (Stowed)
2333049	79	Magnetic Properties Subpackage #2 (Stowed)
2338178	39	Stray Field Magnetic Properties (Deployed)
2334335-Environ. 2333032B-IST	70	Thermal/Vacuum Acceptance
2334346-Design Limit Baseline IST	97	
2338600-Modified IST Vib. & Mod.	83	Design Limit Vibration SP #1
2334348 Design Limit 2333015-SIDE Modified PIA	85	Design Limit Vibration Subpackage #2

TP	ATR	SUBJECT
2334328-Shock 2338600-Mod. IST	87	Qualification Shock Test Subpackage # 1
2334331-Shock 2333015-Post Test Verification SIDE-PIA 2333057-(page 7 only) RTG Resistance	89	Subpackage No. 2 Shock
2334343-Acceleration 2338600-Modified IST	91	Subpackage #1 Acceleration Qualification
2334330-Acceleration 2333015-SIDE PIA 2333059-RTG Functional	93	Subpackage #2 Acceleration Qualification
2334345-System Test 2338610-Environment	102	Mission Simulation
2338617-IST 2338610-(Sec. 6.9) Environment	104	Design Limit Thermal Vacuum Test
	266	Transmitter
	236	90 Channel MUX
23414196-Environmental T/V 2341497 -Functional T/V 2344948 -ASE Qual Vib. 2344932 -ASE C/S Qual Vib.	235	Requal ASE Post EMI Fixes

TP	ATR	SUBJECT
2333069E-HFE P/A 2337939D-SP 2 Mass Properties	258	Array D Subpackage II Qual
2347062-Acceptance Vib. (Non Op.)	259	Subpackage II Qual
2346328-Qual Vib. (Non Op.)	260	Subpackage II Qual
2346329-Qual Shock (Non Op.)	261	Subpackage II Qual
2347058-SP 2 Boydbolt Verf. 2333069E-HFE P/A	262	Subpackage II Qual
2333049D-SP 2 Mag Prop.	263	Subpackage II Qual
2347072-Antenna Aiming Mech. Functional	264	Subpackage II Qual
2333025A-Baseline Functional 2333023B, 2338643	171	Qual C
2333026-Thermal Vacuum 2337912ADesign Limit	172	Qual C
2333076A-ASE EMI	186	Qual C
2334363A-ASE Mass Prop.	174	Qual C
2333025C-Pre-Induced En- 2333023C, ments 2338643	175	Qual C
2334322A-Induced Environ- 2334324, ments 2334323, 2338641	176	Qual C

TP	ATR	SUBJECT
2333025D-Post Induced 2333023C, Environments 2338643	177	Qual C
2334353B-System EMI 2337934, 2338180B	216	Qual C
2341496-Requal 2341497, Post EMI Fixes 2344932, 2344948	235	Qual C
12-P 11261B	294	Redundant Command Receiver Component Qual, Array D

APPENDIX A

QSL SHEET COMPARISON CRITERIA

The qualification status defined in the Appendix B QSL Sheets (BxA format 970-12) is presented in a manner to compare ALSEP equipment specified environment or parametric requirements to the stress levels achieved during Qual SD or previous programs.

The qualification status has been established by the qualification testing accomplished at BxA or at the vendor facility during a component qual program and is reflected on the applicable QSL sheets by the listing of the appropriate test procedure, test reports and remarks relative to each test or to prior qualification tests.

Qualification testing of ALSEP for vibration shock, and acceleration was required at the system level only except for those items qualified on a component basis. That is, all equipments that comprise ALSEP were subjected to design limit levels for a stowed configuration, simulating the mounting of ALSEP into the LM compartment. The qualification vibration levels for Array D Subpackage 2 qualification are depicted in Figures 1 through 5. The following references are provided to allow identification of the qualification vibration levels for various components during previous test programs:

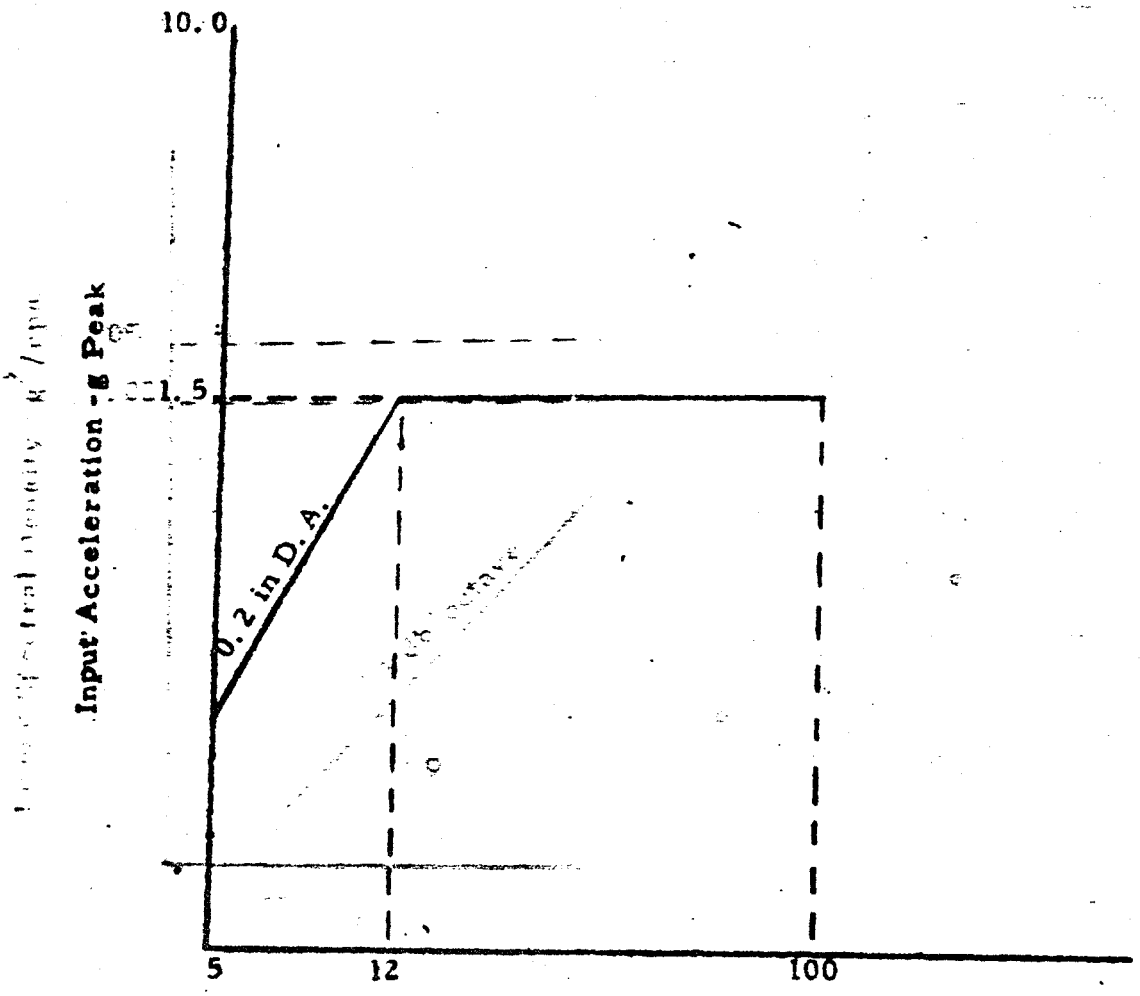
ATM 765	Qualification Status List for Array A
ATM 825	Qualification Status List for Array B
ATM 859	Qualification Status List for Array C
ATM 986	Qualification Status List for Array A2

The qualification testing of Qual SA required testing to qualify the Array SA sunshield and astronaut switches. For the induced environments test, a Subpackage #1 was employed with mass simulators used for the previously qualified experiments.

The qualification levels for the Command Receiver, Transmitter, A/D Converter, RSST, and Multiplexer at the component levels are as indicated on each applicable item QSL sheet in Appendix B.

The SP #2 and HFE requalification was accomplished per BxA TM-598, Rev. B and the TP's listed in Section 4.

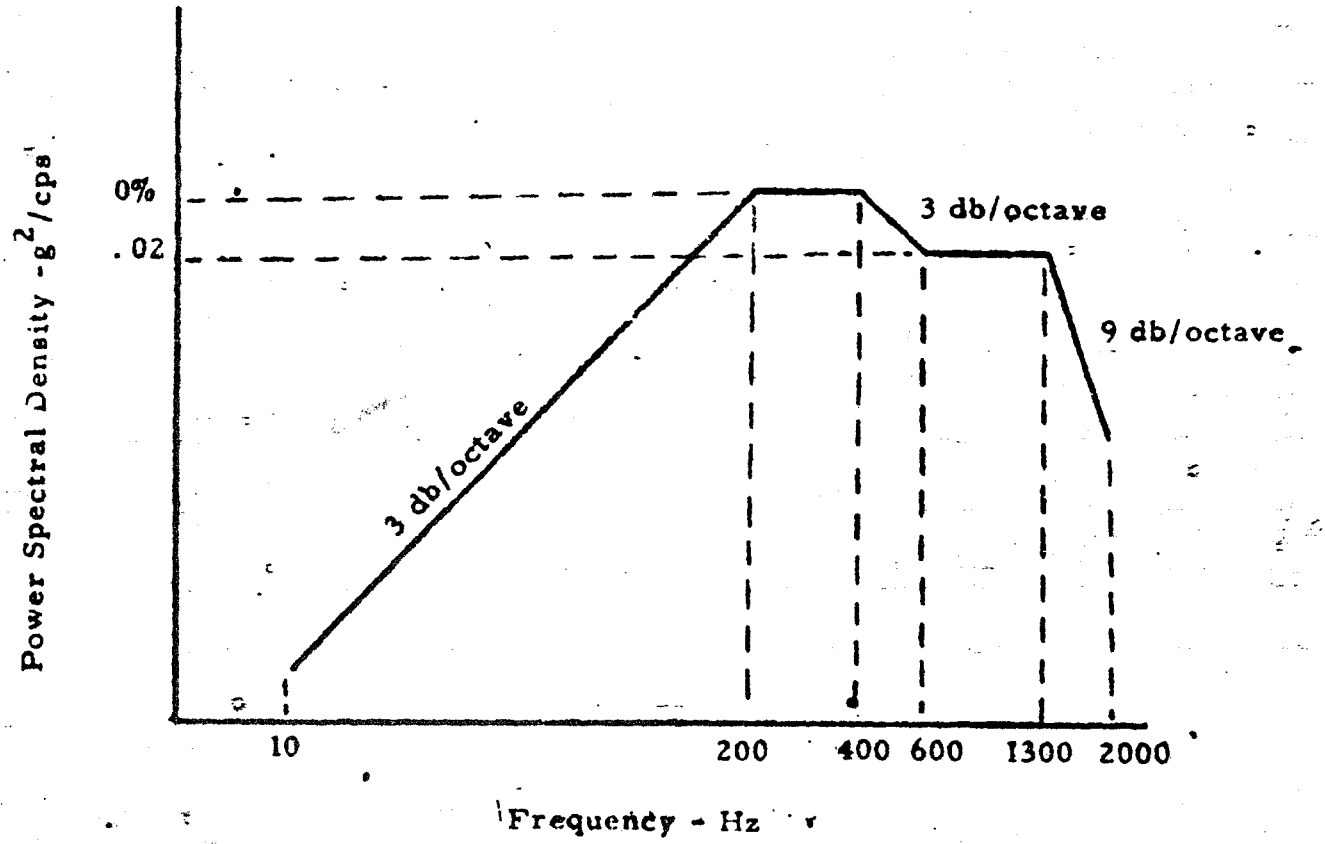
Sweep Rate = 3 Octave/Minute
(5-100-5 cps), g-peak Tolerance ±10%



Subpackage 2
Launch Boost & Lunar Descent, Sine
Vibration Design Limit. All-Axes

Figure 1

Test duration 1.0 minutes power spectral density tolerance ±3 db



Subpackage 2
Earth Launch Boost Phase Random Vibration Spectrum Design Limit.
X-Axis only

Figure 2

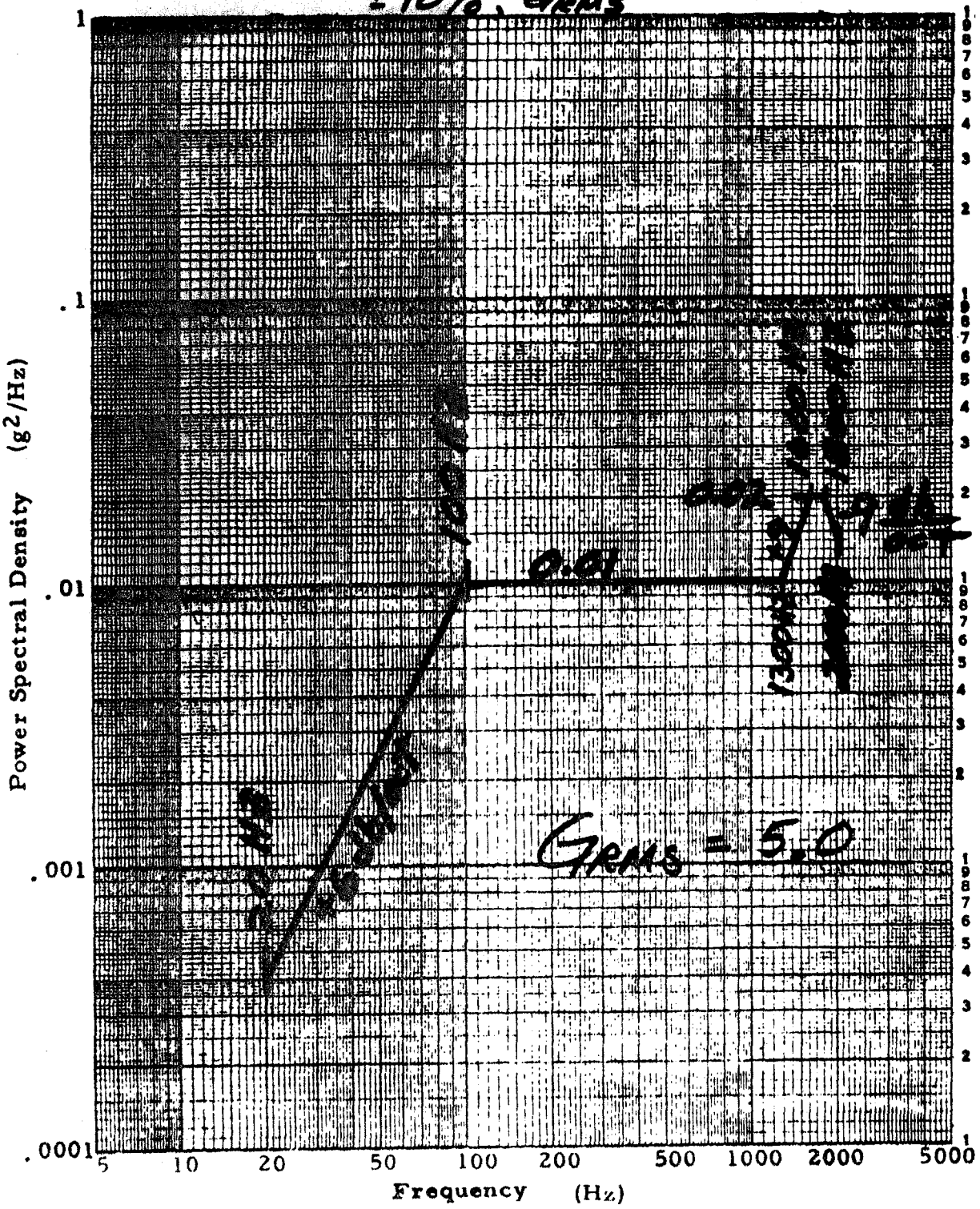
Design Limit Levels
L & B

RANDOM VIBRATION SPECTRUM

Axis: y

Duration: 1.0 MIN

tolerances: ±3 db, PSD
±10%, Grms



Aerospace Systems Division

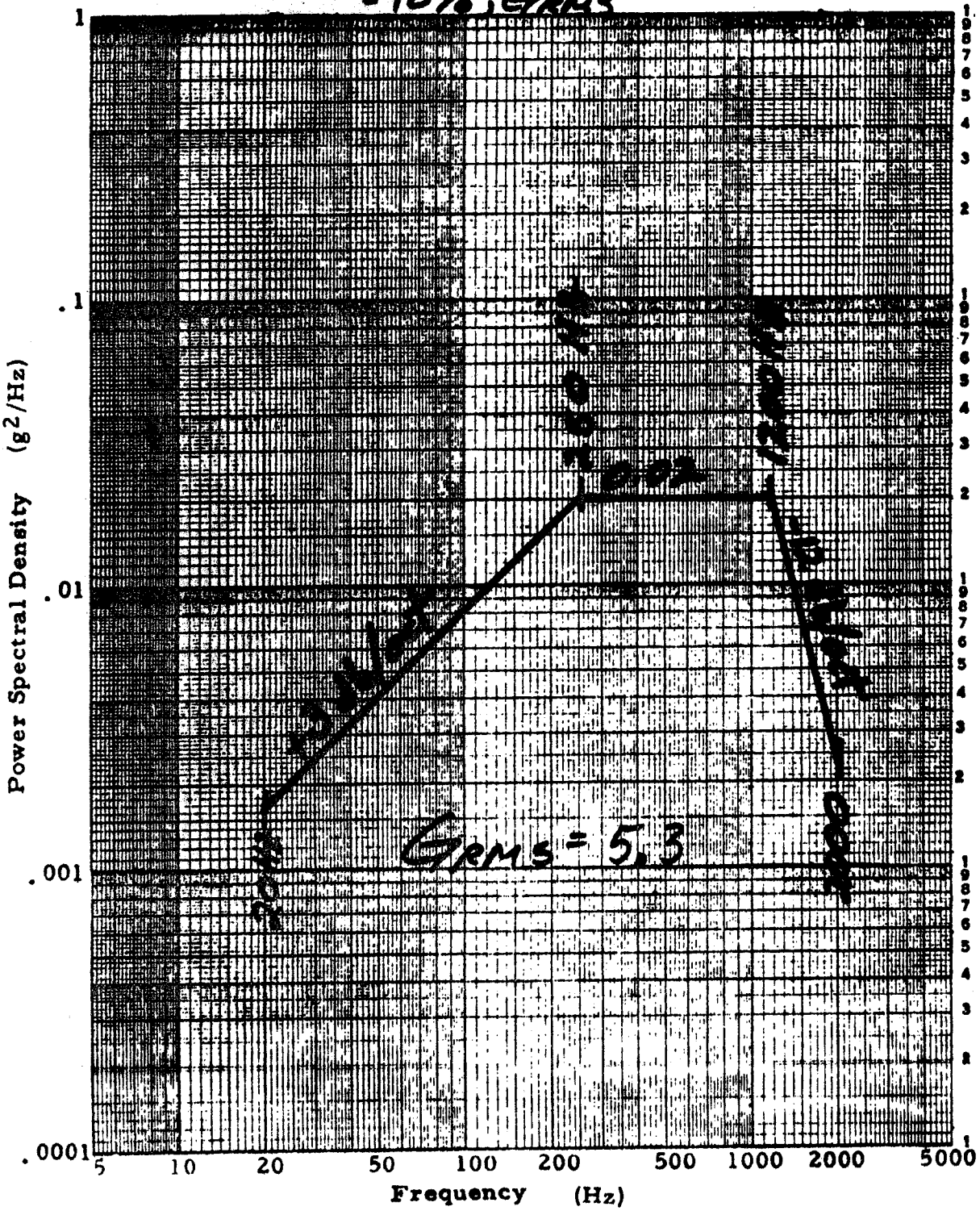
Design Limit Level
L & B

RANDOM VIBRATION SPECTRUM
(SP-2 only)

Axis: Z

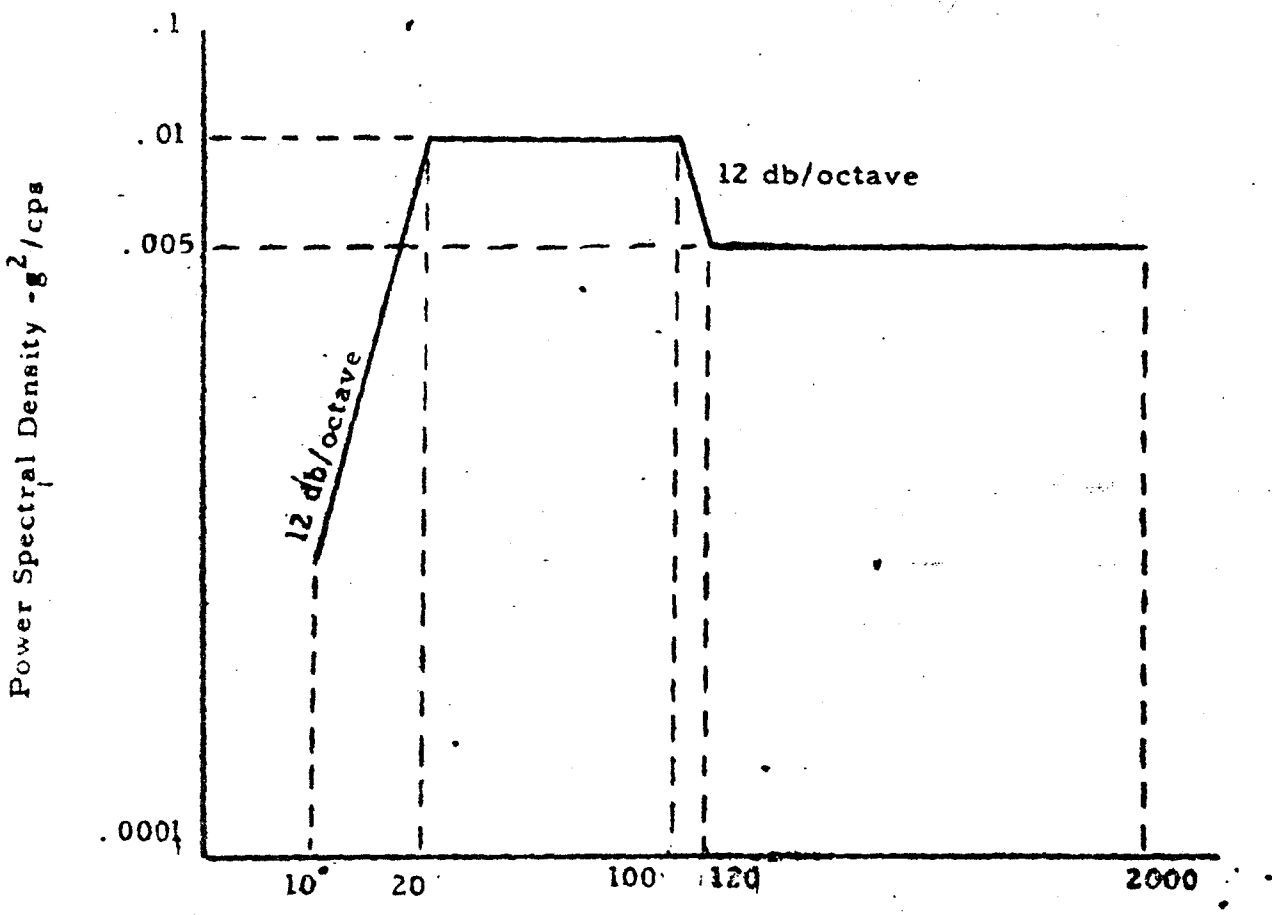
Duration: 1.0 min

Tolerances: ± 3db, PSD
± 10%, GRMS



Test Duration 12.5 minutes Power Spectral Density ±3 db

NOTE*: Variation item #14 of TP 2346328 changes PSD from .01 to .005.



Subpackage 2
Lunar Descent Random Vibration Spectrum
Design Limit. All Axes

Figure 5

Sheet	Assembly Item
B1	SUBPACKAGE #1
B2	SP #1, Antenna Assembly
(B3-B13)	Central Station Components
B3	Filter Diplexer
B4	Diplexer Switch
B5	16 Channel Mux-ADC
B6	Command Decoder
B7	Data Processor
B8	Transmitter
B9	90 Channel Multiplexer
B10	Power Distribution Unit
B11	Power Conditioning Unit
B12	C/S Timer (RSST)
B13	Command Receiver
(B14-B17)	Passive Seismic Experiment
B14	PSE Sensor Assembly
B15	PSE C/S Electronics
B16	Shroud, Thermal Control
B17	PSE Gnomon Assembly
B18	Lunar Seismic Magnatometer (LSM)
(B19-B21)	Active Seismic Experiment
B19	Mortar Package Assembly
B20	ASE/CSE
B21	Thumper Geophone Assembly
B22	SUBPACKAGE #2
B23	RTG Assembly
B24	RTG Shorting Plug
B25	ALHT
B26	PSE Leveling Stool
B27	Heat Flow Experiment (HFE)

QUALIFICATION STATUS LIST-ALSEP PROGRAM - ASSEMBLY, SUBPACKAGE #1

Date 9/30/71	No. ATM-1052	Rev. No.
Analyst	Page ____ of ____ Pages	

Item Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks See Note 1.
		Requirement	Capability	Agent	Location	Document Reference	Date	
Subpackage #1 BxA 2339000 S/N 19, Flight 5 SA Qual 2334848, S/N3	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	 -300°F to +250°F -65°F to +160°F -300°F to +250°F	 -300°F to +250°F External SP #1 Conditions	BxA	Ann Arbor, Mich	TP2334335 TP2333032 ATR-60, 70 BSR-2367, 2376	6/10/68	Successfully Qualified on QSA Qualified on Qa
	Pressure Operating Non-Operating	10^{-12} Torr SL to 10^{-12} Torr	Tested to 5×10^{-6} Torr	BxA	Same	Same as above	6/10/68	Test level limited by test equipment capabilities
	Humidity Operating Non-Operating	N/A 15-100%	Designed to meet Requirements	BxA	Same	N/A	N/A	N/A
	Vibration Operating (N/A) Non-Operating Launch & Flight Lunar Landing	See appendix A herein.	Tested to Design Limit V:b Levels indicated in Figures 1-5	BxA	Same	TP2334343 ATR-82, 83 BSR-2402, 2403	6/28/68	Successfully Qualified on Qual SA
	Acceleration Operating Non-Operating	N/A 14g-axis	Tested to 14.5g 1 minute duration each axis.	BxA	Same	TP2334343 ATR-90, 91 BSR-2412, 2413	7/4/68	Same as above
	Shock Operating Non-Operating	N/A 15g-11 ms	Tested to 15± 2g 11 ms saw-tooth each axis	BxA	Same	TP2334328 ATR-86, 87 BSR-2406, 2407	6/29/68	Same as above
	Salt Spray	N/A						No Test Required
	Sand & Dust	Not defined						No Test Required
	Fungus	N/A						No Test Required
	Acoustical Noise	Not defined						No Test Required
	Rain	N/A						No Test Required
	Radiation	LED-520	$130 W/ft^2$	BxA	Ann Arbor, Mich	TP 2337912	6/10/68	See Operating Temperature
	Explosion Proof	N/A						No Test Required
	PARAMETRIC Functional Performance ALSEP TM-342	Tested as part of the integrated system in space simulation chamber	Capable of start-up and operation lunar surface	BxA	Ann Arbor, Mich	TP2334345 TP2338610 ATR. 101-102	6/10/68 8/7/68	Qualified on QSA

QUALIFICATION STATUS LIST-ALSEP PROGRAM SUBPACKAGE I, ANTENNA ASSEMBLY

Revised 1/31/69

Date 8/30/71	No. ATM-1052	Rev. No.
Analyst R. O. J.	Page ____ of ____ Pages	

Item Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks
		Requirement	Capability	Agent	Location	Document Reference	Date	
Antenna Assembly Helical Antenna BxA 2330307, S/N 5, Flight 5 SA Qual S/N 4 Antenna Cable BxA 2334522, S/N 6, Flight 5 SA Qual 2330300, S/N 4 Antenna Gimbal Package BxA 2339140, S/N 8 S/N 9, 2339175 Flight 5 SA Qual 2339140 S/N 7 2339175 S/N 4	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	 -250°F to +300°F -65°F to +160°F N/A	Tested in Space Simulation Chamber for temp excursions of -300°F to +250°F	Bendix Aerospace Systems	Ann Arbor, Mich	TP 2334335 ATR-60, 70 BSR-2367, 2376	May-June 1968	Qualification of the Antenna Assy has been accomplished at system level during Qual SA.
	Pressure Operating Non-Operating	 $1x10^{-12}$ mmHg Sea L to 10^{-8} mmHg	Verified to $5x10^{-6}$ Torrs in Space Sim Cham	Bendix Aerospace Systems	Ann Arbor, Mich	TP2334335 ATR-60, 70 BSR-2367, 2376		Test level limited by test equipment capabilities
	Humidity Operating Non-Operating	 N/A 15% to 100% RH	Designed to meet Humidity Req'mt	Bendix Aerospace Systems	Ann Arbor, Mich	N/A	N/A	No Testing required
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	 N/A Refer to ATR-16 Addendum 1	Tested in stowed configuration to vibration design limits indicated in Figs 1 thru 5	Bendix Aerospace Systems	Ann Arbor, Mich	T. P. 2334346 ATR-82, 83 BSR-2402, 2403	June-July 1968	In stowed configuration, the aiming mechanism is mounted on S/P#2. Refer to ATM-776 for x-Axis Random Vibration Qual level for Earth Launch
	Acceleration Operating Non-Operating	 N/A ATR-16, Add. 1	Tested in stowed configuration 14 ±1g, 1 min 5 tests ea axis	Bendix Aerospace Systems	Ann Arbor, Mich	TP 2334343 ATR-90, 91 BSR-2412, 2413	July 1968	Boost Phase Successfully qualified (See note)
	Shock Operating Non-Operating	 N/A ATR-16, Add. 1	Tested in stowed configuration 15g±2, 11 ms 3 times ea axis	Bendix Aerospace Systems	Ann Arbor, Mich	TP 2334328 ATR-86, 87 2406, 2407	July 1968	↓
	Salt Spray	N/A						
	Sand & Dust	LED-520	Exceeds Req	Bendix Research Labs	Southfield, Mich	Design Verif.	June 1967	Verified by Analysis
	Fungus	N/A						
	Acoustical Noise	N/A						
	Rain	N/A						
	Radiation	LED-520	Exceeds Req	Bendix Research Labs	Southfield, Mich	Design Verif.	June 1967	Verified by Analysis
	Explosion Proof	N/A						
	PARAMETRIC Radiated Power (Eff. Beamwidth Transmit/Receive)	 42.5 dbm 27°@ 11.7 db 27°@11.0 db	 42.5 dbm 29°@ 11.7 db 31°@11.0 db	Bendix Research Labs	Southfield, Mich	Design Verif. Report #4028	June 1967	Post environmental functional tests sucessfully performed on the antenna assembly at Bx Research
	Input VSWR @Transmitter f_o @Receiver f_o	 1.25:1 1.5:1	 1.25:1 1.50:1	Bendix Research Labs	Southfield, Mich.	Design Verif. Report #4028		on 9/12/68 per TP2338629 and documented by Report BRL #4620
	Minimum Power Handling Capability Maximum Aiming Error	1.5w CW @Transmitter f_o 1.16° RMS	1.5w CW @Transmitter f_o 0.75° RMS	Bendix Research Labs	Southfield, Mich	Design Verif. Design Verif. Report #4037		

QUALIFICATION STATUS LIST-ALSEP PROGRAM

CENTRAL STATION ELECTRONICS
COMPONENTS

Date 9/30/71	No. ATM-1052	Rev. No.
Analyst Rantec	Page ____ of ____ Pages	

Item Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks
		Requirement	Capability	Agent	Location	Document Reference	Date	
Filter, Diplexer BxA #2330525 S/N 8, **Flight** 5 BxA #2330525 SA Qual, S/N 5	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	 -25°F to +160°F -65°F to +160°F	 OK per reqm OK per reqm	 Rantec Wyle Labs	 Calabasas, Calif El Segundo, Calif	 Rantec #66279-QTP	 2/19/67 2/6/67	1. Qualification verified in SP#1 Qual SA test
	Pressure Operating Non-Operating	 $\leq 10^{-12}$ Torr 30 to 1.3 Torr	 1×10^{-5} Torr OK	Wyle Labs	El Segundo, Calif		2/20/67	(Qualified in system to 5×10^{-6} Torrs)
	Humidity Operating Non-Operating	 15 to 100% R. H.	100% RH at 160°F 100% RH at 120°F	↓	↓	↓	2/8/67	NA
	Vibration-Operating Non-Operating	N/A Random: 15 to 150 cps, $0.2g^2$/cps Sine: 5 to 20 cps 0.4 in. D. A. 20 to 100 cps 8g's	OK per reqm.	↓	↓	↓	2/13/67	See remark 1
	Acceleration Non-Operating	N/A 25 g's ea. axis	OK per reqm	↓	↓	↓	2/10/67	See remark 1
	Shock Operating Non-Operating	N/A 20 g's ea. axis	OK per reqm.	↓	↓	↓	2/9/67	See remark 1
	Salt Spray	N/A	N/A					
	Sand & Dust	N/A	N/A					
	Fungus	N/A	N/A					
	Acoustical Noise	N/A	N/A					
	Rain	N/A	N/A					
	Radiation EMI	Radiated at fo=***52db		Bunker Ramo	Canoga Park Calif	66279-QTP	2/22/67	
	Explosion Proof	N/A	N/A					
	PARAMETRIC VSWR	1.36:1 Max all ports	1.22:1 max 33 Mc Min	Rantec	Calabasas, Calif.	66279-PTP-D	Before and after each environmental test	Qualified as part of an integrated system in the space simulation chamber during Qual S/A
	Insertion Loss	0.8 db Max	0.73 db max	Rantec	Calabasas, Calif.	66279-PTP-D	1/16/67 to 2/23/67	TP 2333032 ATR-60, 70 June 1968
	Isolation between Channels	50 db f_r to f_{LO} 80 db f_t to f_r	90 db min >100 db min	Rantec	Calabasas, Calif.	66279-PTP-D	1/16/67 to 2/23/67	

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		Requirement	Capability	Agent	Location	Document Reference	Date	
Diplexer Switch BxA #2330526, S/N 7, Flight 5 SA Qual, S/N 5	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	 -25°F to -160°F -65°F to -160°F ---	 OK per reqm. OK per reqm.	Rantec Wyle Labs	Calabasas, Calif El Segundo Calif	66279-QTP	2/19/67 2/6/67	1. Qualification verified in SP#1 Qual SA test.
	Pressure Operating Non-Operating	10-12 Torr 30 to 1.3 Torr	1×10^{-5} Torr OK	Wyle Labs	El Segundo Calif	66279-QTP	2/20/67	Qualified in system to 5×10^{-6} Torrs
	Humidity Operating Non-Operating	15 to 100% R.H.	100% RH at 160°F 100% RH at 120°F	↓	↓	↓	2/8/67	
	Vibration -Operating Non-Operating	N/A Random: 15 to 150 cps, 0.2 g^2/cps Sine: 5 to 20 cps 0.4 in. D.A. 20 to 100 cps, 8'gs	OK per reqm	↓	↓	↓	2/13/67	See remark 1
	Acceleration Operating Non-Operating	N/A 25g's ea axis	OK per reqm.	↓	↓	↓	2/10/67	See remark 1
	Shock Operating Non-Operating	N/A 20 g's ea axis	OK per reqm	↓	↓	↓	2/9/67	See remark 1
	Salt Spray	N/A	N/A					
	Sand & Dust	N/A	N/A					
	Fungus	N/A	N/A					
	Acoustical Noise	N/A	N/A					
	Rain	N/A	N/A					
	Radiation	Radiated at fo=**	50 db	Bunker Ramo	Canoga Park Calif	66279-QTP	2/22/67	
	Explosion Proof	N/A	N/A					
	PARAMETRIC VSWR	1.3e:1 Max	1.21:1 max (130 Mc min)	Rantec	Calabasas, Calif	66279-PTP-S	Before and after each environmental test	
	Insertion Loss	0.7 db Max	0.63 db max	Rantec	Calabasas, Calif	66279-PTP-S	1/1o/67 to 2/23/67	Qualified as part of an integrated system in the space simulation chamber during Qual SA
	Isolation between Channels	20 db Min Port A to Port B or vice versa	22 db min	Rantec	Calabasas, Calif	66279-PTP-S	1/1o/67 to 2/23/67	

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** 2119 mc and 2277 mc

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		Requirement	Capability	Agent	Location	Document Reference	Date	
16 Channel ASE MUX-ADC BxA 2346700 S/N 13 BxA 2346700 S/N 14 Flight 5	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	-22°F to +158°F	-22°F to +158°F	BxA	Ann Arbor, Mich	Qualification Test Report ATR-291	10 Aug 1971	
	Pressure Operating Non-Operating	1×10^{-5} mm of Hg	1×10^{-5} mm of Hg	BxA	Same	Same	10 Aug 1971	Test level limited by equipment capability
	Humidity Operating Non-Operating	N/A 95% RH for 1 cycle	N/A 95% RH for 1 cycle	BxA	Same	Same	10 Aug 1971	No test required
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	Per AL-410800 Rev A	Per AL-410800 Rev A	BxA	Same	Same	10 Aug 1971	
	Acceleration Operating Non-Operating	14.0 G's along each of three axes, steady	14.0 G's along each of three axes, steady	BxA	Same	Same	10 Aug 1971	
	Shock Operating Non-Operating	20 G-peak 11 ms sawtooth per MIL-STD 810B	20 G-peak 11 ms sawtooth per MIL-STD 810B	BxA	Same	Same	10 Aug 1971	
	Salt Spray	N/A	N/A					No test required
	Sand & Dust	N/A	N/A					No test required
	Fungus	N/A	N/A					No test required
	Acoustical Noise	N/A	N/A					No test required
	Rain	N/A	N/A					No test required
	Radiation	N/A	N/A					No test required
	Explosion Proof	N/A	N/A					No test required
	PARAMETRIC Functional Performance	Per AL-410800 Rev A	Per AL-410800 Rev A	BxA	Ann Arbor, Mich	Qualifiation Test Report ATR-291	10 Aug 1971	
	EMI Performance	Per AL-410800 Rev A	Per AL-410800 Rev A	BxA	Ann Arbor, Mich	Qualification Test Report ATR-291	10 Aug 1971	

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		Requirement	Capability	Agent	Location	Document Reference	Date	
Command Decoder ~~BxA~~ #2330509 S/N 8, Flight 5 SA Qual, S/N 2	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	 -22°F to +158°F -65°F to +160°F N/A	 -22°F to +158°F -65°F to +160°F N/A	Bendix Aerospace	Ann Arbor, Mich.	TP 2334335 ATR-60, 70 BSR-2363, 2376	May-June 1968	Qualified in SP#1 during Qual SA test
	Pressure Operating Non-Operating	 1×10^{-12} mmHg S/L to 1×10 mmHg	 Tested in Space Sim. Chamber to 5×10^{-6} Torr	Bendix Aerospace	Ann Arbor, Mich	BSR-2363, 2376	May-June 1968	Test Level Limited by Equipment Capability
	Humidity Operating Non-Operating	 N/A 15% to 100%	 Designed to meet Humidity Requirements	Bendix Aerospace	Ann Arbor, Mich.	N/A	N/A	No testing required.
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	 N/A Refer to ATR-16 Addendum 1	 Tested to S/P#1 Design Limit Test Levels Refer to figures 1 through 5	Bendix Aerospace	Ann Arbor, Mich.	TP2334346 ATR-82, 83 BSR-2402, 2403	June 1968	Qualified to Design Limit Test Levels for Subpackage #1 (in the stowed configuration) during Qual SA
	Acceleration Operating Non-Operating	 N/A ATR-16, Add. 1	 Tested to 14 ± 1 g 1 Min Duration 5 times in Axis	Bendix Aerospace	Ann Arbor, Mich	TP 2334343 ATR-90, 91 BSR-2414, 2413	July 1968	Qualified to Design Limit Test Levels for Subpackage #1 (in the stowed configuration)
	Shock Operating Non-Operating	 N/A ATR-16, Add. 1	 Tested to 15 ± 2 g 11 ms Sawtooth 3 times in Axis	Bendix Aerospace	Ann Arbor, Mich.	TP 2334328 ATR-86, 87 BSR-2406, 2407	July 1968	Qualified to Design Limit Test Levels for Subpackage #1 ~~(in the stowed configuration)~~
	Salt Spray	N/A	N/A	Bendix Aerospace	Ann Arbor, Mich.			
	Sand & Dust	Not Defined	Designed to Meet	Bendix Aerospace	Ann Arbor, Mich.			
	Fungus	N/A	N/A	Bendix Aerospace	Ann Arbor, Mich.			
	Acoustical Noise	Not Defined		Bendix Aerospace	Ann Arbor, Mich.			
	Rain	N/A	N/A	Bendix Aerospace	Ann Arbor, Mich.			
	Radiation	Not Defined	I. R. 130 w/ft^2	Bendix Aerospace	Ann Arbor, Mich	TP 2334335	May-June 1968	
	Explosion Proof	N/A	N/A	Bendix Aerospace	Ann Arbor, Mich.			
	PARAMETRIC Functional Performance	Tested as part of Integrated System in space Simulation Chamber		Bendix Aerospace	Ann Arbor, Mich	TP 2333032 ATR-60, 70 BSR-2367, 2376	May-June 1968	Qualified via Integrated System Thermal Vacuum Test for a Simulated Lunar Mission during Qual SA
	EMI Performance	Tested as part of Integrated System to AL770 000		Bendix Aerospace	Ann Arbor, Mich	TP2333087 ATR-27, 33 BSR-2300, 2320	May-June 1968	Same as above

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		Requirement AL 310900	Capability	Agent	Location	Document Reference	Date	
Data Processor BxA #2330521, S/N 12 Flight 5 SA Qual, S/N 3	ENVIRONMENTAL Temperature: Operating	-22°F to +158°F	-22°F to +158°F	Bendix Aerospace Systems Division	Ann Arbor, Mich	T.P. 2334335 ATR-60, 70 BSR-2367, 2376	May-June 1968	Successfully tested model on Qual SA model
	Non-Operating Earth	-65°F to +185°F	-65°F to +185°F					
	Moon	N/A						
	Pressure Operating Non-Operating	1x10^{-12} mmHg AMB to 1x10^{-12} mmHg	Tested is spare chamber to 5 x 10^{-6} Torr					Test level limited by Equipment Capability.
	Humidity Operating Non-Operating	N/A 15% to 100%	Designed to meet humidity requirements			N/A	N/A	No testing required
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	NA Refer to ATR-16 Addendum 1	Tested to S/P #1 Design Limit Test Levels. Refer to figures 1 thru 5.			T.P. 2334346 ATR-82, 83 BSR-2402, 2403	June-July 1968	Qualified at subpackage of Design Limit Test Levels for a stowed configuration.
	Acceleration Operating Non-Operating	N/A ATR-16, Add. 1	Tested to 14 ± 1g 1 Min Duration 5 times ea. Axis.			T.P. 2334343 ATR-90, 91 BSR-2412, 2413		
	Shock Operating Non-Operating	N/A ATR-16, Add. 1	Tested to 15 ± 2g 11 ms sawtooth 3 times ea. Axis.			T.P. 2334328 ATR-86, 87 BSR-2406, 2407		
	Salt Spray	N/A	N/A					
	Sand & Dust	Not Defined						
	Fungus	N/A	N/A					
	Acoustical Noise	Not Defined	--					
	Rain	N/A	N/A					
	Radiation	Not Defined	130 w/ft^2 IR Lamp			T.P. 2334335	May-June '68	
	Explosion Proof	N/A	N/A					
	PARAMETRIC See Table I Sheet B-9	Tested as part of Integrated System in Space Simulation Chamber				T.P. 2333032 ATR-60, 70 BSR-2367, 2376	May-June 1968	Qualified to Integrated System Thermal Vacuum Test for a simulated lunar mission during Qual SA
	EMI Performance	Tested as part of Integrated System				TP2333087 ATR-27, 33 BSR-2300, 2320	May-June 1968	Same as above

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Item Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks
		Requirement	Capability	Agent	Location	Document Reference	Date	
Transmitter BxA #2345250, Qual Units, S/N 21, 23, 24	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	 -22°F to +158°F -65°F to +200°F N/A	 -22°F to +158°F -65°F to +200°F N/A	BxA	Ann Arbor Michigan	Qualification Test Report ATR 266	1-12-71	Successfully qualified at component level
Flight 5 Flight Model S/N 28 S/N 29	Pressure Operating Non-Operating	 $1x10^{-12}$ torr 760 to $1x10^{-5}$ torr	 $1x10^{-5}$ torr $1x10^{-5}$ torr	BxA	Ann Arbor Michigan	TP 2345106	9-21-70	Test Level Limited By Equipment Capability
	Humidity Operating Non-Operating	 95% at 140°F	 95% at 140°F	BxA	Ann Arbor Michigan	N/A	N/A	No Test Required
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	 Per TM 511	 Per TM 511	BxA	Ann Arbor, Michigan	TP 2345118 TP 2345104	5-18-70 9-17-70	See first remark
	Acceleration Operating Non-Operating	 N/A	 N/A	BxA	Ann Arbor Michigan	N/A	N/A	No Test Required
	Shock Operating Non-Operating	 N/A 20g peak; 11msec	 N/A 20g peak, 11msec	BxA	Ann Arbor Michigan	TP 2345105	2-18-70	See first remark
	Salt Spray	N/A	N/A					No Test Required
	Sand & Dust	N/A	N/A					No Test Required
	Fungus	N/A	N/A					No Test Required
	Acoustical Noise	N/A	N/A					No Test Required
	Rain	N/A	N/A					No Test Required
	Radiation	N/A	N/A					No Test Required
	Explosion Proof	N/A	N/A					No Test Required
	PARAMETRIC Functional Performance	Per AL-410400	Per AL-410400	BxA	Ann Arbor Michigan	Qualification Test Report ATR 266	1-12-71	See first remark
	EMI Performance	Per AL-410400	Per AL-410400	BxA	Ann Arbor Michigan	Qualification Test Report ATR 266	1-12-71	Performance Found Acceptable In A-2 System-level Test

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Item Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks
		Requirement	Capability	Agent	Location	Document Reference	Date	
Multiplexer-ADC BxA#2345500, S/N 15 Qual S/N 16 Flight 5	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	-22°F to +158°F	-22°F to +158°F	BxA	Ann Arbor, Mich	Qualification Test Report ATR 292	10 Aug 1971	During design limit T/V test, thermal plate stayed for two hours at average temp. of +140°F. All C/S components operated satisfactorily.
	Pressure Operating Non-Operating	$1x10^{-5}$ mm of Hg.	$1x10^{-5}$ mm of Hg.	BxA	Ann Arbor, Mich	Qualification Test Report ATR 292	10 Aug 1971	Test level limited by equipment capability.
	Humidity Operating Non-Operating	N/A *95% humidity for 1 cycle	N/A *95% humidity for 1 cycle	BxA	Ann Arbor, Mich	Qualification Test Report ATR 292	10 Aug 1971	No test required.
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	Per AL-410700 Rev A	Per AL-410700 Rev A	BxA	Ann Arbor, Mich	Qualification Test Report ATR 292	10 Aug 1971	
	Acceleration Operating Non-Operating	14.0 G's along each of three axes, steady.	14.0 G's along each of three axes, steady.	BxA	Ann Arbor, Mich	Qualification Test Report ATR 292	10 Aug 1971	
	Shock Operating Non-Operating	20 G-peak/11 msec sawtooth per MIL-STD-810B	20 G-peak/11 msec sawtooth per MIL-STD-810B	BxA	Ann Arbor, Mich	Qualification Test Report ATR 292	10 Aug 1971	
	Salt Spray	N/A	N/A					No test required.
	Sand & Dust	N/A	N/A					No test required.
	Fungus	N/A	N/A					No test required.
	Acoustical Noise	N/A	N/A					No test required.
	Rain	N/A	N/A					No test required.
	Radiation	N/A	N/A					No test required.
	Explosion Proof	N/A	N/A					No test required.
	PARAMETRIC Functional Performance	Per AL-410700 Rev A	Per AL-410700 Rev A	BxA	Ann Arbor, Mich	Qualification Test Report ATR 292	10 Aug 1971	
	EMI Performance	Per AL-410700 Rev A	Per AL-410700 Rev A	BxA	Ann Arbor, Mich	Qualification Test Report ATR 292	10 Aug 1971	

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*Per MIL-STD-810A

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Item Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks
		Requirement	Capability	Agent	Location	Document Reference	Date	
Power Distribution Unit (PDU) BxA 2330450-2 S/N 11, Flight 5 SA Qual, S/N 4	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	 $-22^{\circ}F$ to $+158^{\circ}F$ $-65^{\circ}F$ to $+160^{\circ}F$ N/A	 $-22^{\circ}F$ to $+158^{\circ}F$ $-65^{\circ}F$ to $+160^{\circ}F$	Bendix Aerospace Systems Division	Ann Arbor, Michigan	TP 2334335 ATR-60, 70 BSR-2367, 2376	May-June 1968	1. Qualified in SP#1 during Qual SA
	Pressure Operating Non-Operating	$1x10^{-12}$ mmHg S/L to $1x10^{-12}$ mm Hg	Tested in Space Simul. Chamber to $5x10^{-6}$ Torrs	Bendix Aerospace Systems Division	Ann Arbor, Michigan	TP 2334335 ATR-60, 70 BSR-2367, 2376	May-June 1968	Test Level Limited by Equipment Capability
	Humidity Operating Non-Operating	N/A 15% to 100%	Designed to meet Humidity Requirements	↓	↓	N/A	N/A	No testing required
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	N/A Refer to ATR-16 Addendum 1	Tested to S/P#1 Design Limit Test Levels Refer to fig 1 thru 5	↓	↓	TP 2334346 ATR-82, 83 BSR-2402, 2403	July 1968	Qualified at Subpackage(S/P)#1 Design Limit Test Levels for a Stowed Configuration during Qual SA
	Acceleration Operating Non-Operating	N/A ATR-16, Add. 1	Tested to 14 ± 1g 1 Min. Duration, 5 times ea Axis	↓	↓	TP 2334343 ATR-90, 91 BSR-2412, 2413	July 1968	↓
	Shock Operating Non-Operating	N/A ATR-16, Add. 1	Tested to 15 ± 2g, 11 mo Sawtooth 3 times ea Axis	↓	↓	TP 2334328 ATR-86, 87 BSR-2406, 2407	July-Aug 1968	↓
	Salt Spray	N/A	N/A					
	Sand & Dust	Not Defined	Designed to Meet					No testing required
	Fungus	N/A	N/A					
	Acoustical Noise	Not Defined						No testing required
	Rain	N/A	N/A					
	Radiation	Not Defined	tested to 130w/ft^2 IR					
	Explosion Proof	N/A	N/A					
	PARAMETRIC							
	Functional Performance	Tested as part of Integrated System in Space Simulation Chamber		BxA	Ann Arbor, Michigan	TP 2333032 ATR-60, 70 BSR-2367, 2376	May-June 1968	See first remark
	EMI Performance	Tested as part of Integrated ~~System~~ to AL770 000		BxA	Ann Arbor, Michigan	TP 2333087 ATR-27, 33 BSR-2300, 2320		See first remark

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Item Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks
		Requirement AL 410109	Capability	Agent	Location	Document Reference	Date	
Power Conditioning Unit (P. C. U.) 2330000-3, S/N 8, Flight 5 SA Qual, S/N 3	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	-22°F to +158°F -65°F to +160°F	-22°F to +158°F -65°F to +160°F	Bendix Aerospace Systems Division	Ann Arbor, Mich.	T. P. 2334335 ATR-60, 70 BSR-2367, 2376	May-June 1968	Qualified in Subpackage #1 system level tests performed on Qual SA
	Pressure Operating Non-Operating	Sea Level to 1×10^{-12} Torr	Tested to 5×10^{-6} Torr			T. P. 2334335 ATR-60, 70 BSR-2367, 2376		Test level limited by Test Equipment Capability
	Humidity Operating Non-Operating	15 to 100%	Designed to meet humidity requirements			N/A	N/A	Testing Not Required
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	ATR-16 Adden. #1	Tested to S/P#1 Design Limits Test Levels(Refer to Fig 1 thru 5)			T. P. 2334346 ATR-82, 83 BSR-2402, 2403	July 1968	Qualified at Subpackage #1 Design Limit Test Levels for a stowed configuration in Qual SA
	Acceleration Operating Non-Operating	ATR-16 Adden. #1	Tested to 14± 1g, 1 min duration, 5 times per axis			T. P. 2334343 ATR-90, 91 BSR-2412, 2413	July 1968	Verified at Subpackage #1 Design Limit Test and for a stowed configuration
	Shock Operating Non-Operating	ATR-16 Adden. #1	Tested to 15± 2g, 11 ms 3 times each axis			T. P. 2334328 ATR-86, 87 BSR-2406, 2407	July 1968	Verified at Subpackage #1 Design Limit Test and for a stowed configuration
	Salt Spray	N/A	N/A					
	Sand & Dust	Not Defined	N/A					No Test Required
	Fungus	N/A	N/A					
	Acoustical Noise	Not Defined	NYD					No Test Required
	Rain	N/A	N/A					
	Radiation	Not Defined	NYD					
	Explosion Proof	Not Defined	N/A					
	PARAMETRIC							
	Functional Performance	Tested as part of System in Space Simulation Chamber	Integrated System	BxA	Ann Arbor, Mich.	T. P. 2333032 ATR-60, 70 BSR-2367, 2376	May-June 1968	See first remark
	EMI Performance	Tested as part of System to AL770000	Integrated	BxA	Ann Arbor, Mich.	T. P. 2333087 ATR-27, 33 BSR-2300, 2320	May-June 1968	See first remark

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Item Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks
		Requirement	Capability	Agent	Location	Document Reference	Date	
RSST SYSTEM 13877-001-01-01 BxA 2338511 S/N 002, Qual S/N 004, Flight 5	ENVIRONMENTAL							
	Temperature:							
	Operating	-22°F to +158°F	-122°F to +158°F	Gulton Industries	Albuq., N. Mex.	13877-992	1/13/70	Note 2
	Non-Operating							
	Earth	-65°F to +200°F	-	-	-	-	-	
	Moon	" "						Note 3
	Pressure							
	Operating	$< 1 \times 10^{-12}$ mmHg	$< 50 \times 10^{-2}$ mmHg	Gulton Industries	Albuq., N. Mex.	13877-992	1/13 70	Note 2, Note 3
	Non-Operating	SL to $< 10^{-8}$ mmHg	"	"	"	"	"	
	Humidity							
	Operating	50%						
	Non-Operating	15 to 100%	-	-	-	-	-	Note 3
	Vibration							
	Operating	n/a	n/a					
	Non-Operating	6G sine peak	6G sine peak	Gulton Industries	Albuq., N. Mex.	13877-992	1 13 70	Note 2 Testing performed at Sparton S. W., Albuq., N. Mex.
	Launch & Flight	5.7G rms	5.7G rms	"	"	"	"	
	Lunar Landing	4.3G rms	4.3G rms	"	"	"	"	
	Acceleration							
	Operating	n/a	n/a					
	Non-Operating	14.0GXYZ 1 min	14.0GXYZ 1 min	Gulton Industries	Albuq., N. Mex.	13877-992	1/13 70	Note 2 Testing performed at Sparton S.W., Albuq., N.Mex.
	Shock							
	Operating	n/a	n/a					
	Non-Operating	20G/11ms	20G/11ms	Gulton Industries	Albuq., N. Mex.	13877-992	1/13 70	Note 2 Testing performed at AETL, L.A., California
	Salt Spray	n/a						
	Sand & Dust	n/a						
	Fungus	n/a						
	Acoustical Noise	n/a						
	Rain	n/a						
	Radiation	n/a						
	Explosion Proof	n/a						
	PARAMETRIC	as given in MIL-I-26600, and NASA MSC-ASPO-EMI -10A	as given in MIL-I-26600, and NASA MSC-ASPO-EMI-10A (See notes.)	Gulton Industries	Albuq., N. Mex.	13877-994	1 21 70	Testing performed at Stand. Electronics, Chicago, Ill.
	NOTES: 1. Certificate of compliance and Gulton test data on file to verify capability 2. These environments were verified by Gulton Industries on 1/13/70 to QTP 13877-992 except pressure which was tested to 5×10^{-2} mmHg. 3. The specified "requirement" levels were not required to be verified by the Gulton RSST qualification test per agreement at the QTRR held at Gulton on 12 January 1970.							

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		Requirement	Capability	Agent	Location	Document Reference	Date	
Command Receiver BxA #2345147 S/N 16, Flight 5 S/N 14, Qual	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	-22°F to +158°F N/A N/A	-22°F to +158°F N/A N/A	Motorola GED	Scottsdale, Ariz.	12-P11261B Revision B ATR 294	12-1-70	
	Pressure Operating Non-Operating	1×10^{-5} mm Hg N/A	1×10^{-5} mm Hg N/A	Motorola GED	Scottsdale, Ariz.	12-P11261B Revision B ATR 294	12-1-70	
	Humidity Operating Non-Operating	N/A 95% Rl at 158°F	N/A 95% RL at 158°F	Motorola GED	Scottsdale, Ariz.	N/A	N/A	This is a Design Requirement of AL-410600, but not required to be verified by test.
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	7.9 G Rms 6 G Sine Peak 5.7 G Rms 4.3 G Rms	7.9 G Rms 6 G Sine Peak 5.7 G Rms 4.3 G Rms	Motorola GED	Scottsdale, Ariz.	12-P11261B Revision B ATR 294	12-1-70	
	Acceleration Operating Non-Operating	N/A 14 G for 1 min.	N/A 14 G for 1 min.	Motorola GED	Scottsdale, Ariz.	ATR 294 12-P11261B Revision B	12-1-70	
	Shock Operating Non-Operating	N/A 20G/11 msec.	N/A 20G/11 msec.	Motorola GED	Scottsdale, Ariz.	ATR 294 12-P11261B Revision B	12-1-70	
	Salt Spray	N/A	N/A					
	Sand & Dust	N/A	N/A					
	Fungus	N/A	N/A					
	Acoustical Noise	N/A	N/A					
	Rain	N/A	N/A					
	Radiation	N/A	N/A					
	Explosion Proof	N/A	N/A					
	PARAMETRIC EMI	AL41600 As Defined in MIL-I-26600 and NASA-ASPO-10A	AL41600 As Defined in MIL-I-26600 and NASA-ASPO-10A	Motorola GED	Scottsdale, Ariz.	ATR 294 12-P11261B Revision A	12-1-70	ECP 3875-9 ECP 3875-10

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Item Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks
		Requirement	Capability	Agent	Location	Document Reference	Date	
PSE Sensor Assembly P/N 233425 BxA #2341604 S/N 8-503. Flight 5 SA Qual 2334648 S/N 3 & 2	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	107° to 125°F -65°F to 160°F Same as Operating	Tested in Space Simulation Chamber for Temperature	Bendix Aerospace Systems Division	Ann Arbor, Michigan	T13022 TP2334335 ATR-60, 70 BSR-2367, 2376	11 Jan 69 June 10, 1968	Successfully tested on BxA Qual SA model
	Pressure Operating Non-Operating	1×10^{-12} mm Hg 1×10^{-8} mm Hg	Verified to 5×10^{-5} Torrs in Space Sim. Cham.	↓	↓	↓		Test level limited by test equipment capability
	Humidity Operating Non-Operating	Not applicable 50-100% R.H.	Designed to Meet Humidity Requirement	↓	↓	N/A	N/A	N/A
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	Not Applicable Refer to ATR-16 Addendum 1	Tested in Stowed Configuration to Vibration Design Limits Indicated in Fig. 1 Thru 5.	↓	↓	TP2334346 ATR-82, 83 BSR-2402, 2403	6/28/68	See first remark
	Acceleration Operating Non-Operating	Not Applicable ATR-16, Add. 1	Tested in Stowed Configuration to 14 ± 1g, 1 Min.	↓	↓	TP2334343 ATR-90, 91 BSR-2412, 2413	7/4/68	See first remark
	Shock Operating Non-Operating	Not Applicable ATR-16, Add. 1	Tested in Stowed Configuration to 15 ± 2g 11ms 3 Times Ea. Axis	↓	↓	TP2334328 ATR-86, 87 BSR-2406, 2407	6/24/68	See first remark
	Salt Spray	Not Applicable	Not Applicable					
	Sand & Dust	LED-520	Designed to Meet					
	Fungus	Not Applicable	Not Applicable					
	Acoustical Noise	Not Applicable	Not Applicable					
	Rain	Not Applicable	Not Applicable					
	Radiation	LED-520	Designed to Meet					
	Explosion Proof	Not Applicable	Not Applicable					
	PARAMETRIC Functional Performance	Tested as part of System in Space Chamber	Integrated Simulation	BxA		TP 2333032 ATR-60, 70 BSR-2367, 2376	June 10 1968	See first remark
	EMI Performance	Tested as part of system	integrated	BxA		TP 2333087 ATR-27, 33 BSR-2300, 2320	April 1968	See first remark

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Item Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks
		Requirement	Capability	Agent	Location	Document Reference	Date	
PSE Central Station Electronics BxA #2334670 S/N 2, Flight 5 SA Qual, S/N 1	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	107°F to 125°F -65°F to 160°F Same as Operating	Tested is Space Simulation Chamber for Temperature	Bendix Aerospace Systems Division	Ann Arbor, Michigan	TP2334335 ATR-60,70 BSR-2367,2376	June 10 1968	Successfully tested on BxA Qual SA model
	Pressure Operating Non-Operating	1×10^{-12} mm Hg 1×10^{-8} mm Hg	Verified to 5×10^{-5} Torrs in Space Sim. Cham.					
	Humidity Operating Non-Operating	Not Applicable	Designed to Meet Humidity Requirements			N/A	N/A	N/A
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	Not Applicable Refer to ATR-16 Addendum 1	Tested in Stowed Configuration to Vibration Design Limits Indicated in Figs. 1 Thru 5.			TP2334346 ATR-82, 83 BSR-2402,2403	6/28/68	Successfully Tested, Qual SA
	Acceleration Operating Non-Operating	Not Applicable ATR-16, Add. 1	Tested in Stowed Configuration to 14 ± 1g. 1 Min.			TP2334343 ATR-90, 91 BSR-2412,2413	7/4/68	Successfully Tested, Qual SA
	Shock Operating Non-Operating	Not Applicable ATR-16, Add. 1	Tested in Stowed Configuration to 15 ± 2g 11ms 3 Times Ea. Axis			TP2334328 ATR-86, 87 BSR-2406,2407	6/24/68	Successfully Tested, Qual SA
	Salt Spray	Not Applicable	Not Applicable					
	Sand & Dust	LED-520	Designed To Meet					
	Fungus	Not Applicable	Not Applicable					
	Acoustical Noise	Not Applicable	Not Applicable					
	Rain	Not Applicable	Not Applicable					
	Radiation	LED-520	Designed to Meet					
	Explosion Proof	Not Applicable	Not Applicable					
	PARAMETRIC Functional Performance	Tested as part of the integrated system in the space simulation chamber		BxA	Ann Arbor, Michigan	TP 2333032 ATR-60-70 BSR-2367,2376	June 10, 1968	See first remark
	EMI Performance	Tested as part of the integrated system		BxA	Ann Arbor, Michigan	TP 2333087 ATR-27, 33 BSR-2300,2320	April 1968	See first remark

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Item Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks
		Requirement	Capability	Agent	Location	Document Reference	Date	
Shroud, Thermal Control P/N 2334016-501, S/N 7, Flt. 5 SA Qual 2334016-501, S/N 3 & 4	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	-300 - -250°F	-300 - +250°F	Earth Sciences Division-Teledyne during DVT thermal vacuum tests	Hughes Aircraft Space Simulation Laboratory El Segundo, Cal.	Engineering Report No. 640-0268-0053	8 Feb. 1968	See Note Below
	Pressure Operating Non-Operating	1×10^{-12} mm Hg Same as oper.	1×10^{-7} mm Hg	"	"	"		
	Humidity Operating Non-Operating	Not applicable 50%-100% R. H.	Designed to Meet Humidity Requirements					
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	See Remarks	Hz g^2/Hz 23-58 0.304 58-100 12db/oct 100-200 0.039 200-430 12db/oct 430-1000 0.99	Earth Sciences Division - Teledyne	Bunker Ramo Corporation Testing Lab Canoga Park, Calif.	DVT Report ENV-R-2363	Nov. 1967	
	Acceleration Operating Non-Operating	Not applicable 14^{+1}_{-0}	 14 g's	"		"	"	
	Shock Operating Non-Operating	Not applicable 20± 1g	20g± 10% saw tooth 10 msec rise 1 msec decay	"	"	"	"	
	Salt Spray	Not applicable	Not applicable					
	Sand & Dust	LED-520	Designed to Meet					
	Fungus	Nonnutrient	Nonnutrient					
	Acoustical Noise	Not applicable	Not applicable					
	Rain	Not applicable	Not applicable					
	Radiation	LED-520	Designed to Meet					
	Explosion Proof	Not applicable	Not applicable					
	PARAMETRIC							
		NOTE: PSE Shroud qualified on Subpackage #1 installation per test and report references shown on SP#1 Sheet B-1.						

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Item Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks
		Requirement	Capability	Agent	Location	Document Reference	Date	
PSE Gnomon Assem BxA=2338016-501 S/N 7, Flight 5 SA Qual 2338016,	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	107°F to 125°F -65°F to 160°F Same as operating	Tested in Space Simulation Chamber for Temperature	Bendix Aerospace Systems Division	Ann Arbor, Michigan	TP2334378 ATR-160 BSR-2570	12/30/68	Successfully Tested at System Level as a Result of Qual SB Test Program
	Pressure Operating Non-Operating	1×10^{-12} mmHg 1×10^{-8} mmHg	Verified to 5×10^{-5} Toors in Space Sim. Cham	"	"			"
	Humidity Operating Non-Operating	Not applicable	Designed to Meet Humidity Requirements	"	"	N/A	N/A	N/A
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	Not applicable Refer to ATR-16 Addendum 1	Tested in Stowed Configuration to Vibration Design Limits Indicated in Figs. 1 thru 5.	"	"	TP2337905 ATR-149 BSR-2546	12/19/68	Successfully Tested at System Level as a Result of Qual SB Test Program
	Acceleration Operating Non-Operating	Not applicable ATR-16, Add. 1	Tested in Stowed Configuration to 14± 1g. Min.	BMSD	Mishawauka, Indiana	TP2337915 ATR-164 BSR-2574	1/15/69	
	Shock Operating Non-Operating	Not applicable ATR-16, Add. 1	Tested in Stowed Configuration to 15± 2g 11ms 3 Times Ea. Axis	Bendix Aerospace Systems Division	Ann Arbor, Michigan	TP2337917 ATR-161 BSR-2571	1/7/69	"
	Salt Spray	Not applicable	Not applicable					
	Sand & Dust	LED-520	Designed to Meet					
	Fungus	Not applicable	Not applicable					
	Acoustical Noise	Not applicable	Not applicable					
	Rain	Not applicable	Not applicable					
	Radiation	LED-520	Designed to Meet					
	Explosion Proof	Not applicable	Not applicable					
	PARAMETRIC							

QUALIFICATION STATUS LIST-ALSEP PROGRAM LUNAR SURFACE MAGNETOMETER EXPERIMENT

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Item Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks
		Requirement	Capability	Agent	Location	Document Reference	Date	
Lunar Surface Magnetometer BxA #2330657 Flt #1 S/N-3 Flt #2 S/N 4 Flt #2-A S/N 7 Flt #5 S/N 4 SA Qual, S/N 2	ENVIRONMENTAL							
	Temperature:							
	Operating	-300°F to 250°F	Not Yet Proven	BxA	Ann Arbor, Michigan	TP2334345	June 1968	Tested in mission Simulation Testing.
	Non-Operating							
	Earth	-65°F to +160°F				ATR-60, 70 BSR-2367, 2376		
	Moon	-300°F to +250°F						
	Pressure	10^{-12} Torr						
	Operating	Sea Level	5×10^{-6} Torr	BxA	Ann Arbor, Michigan	TP2333032 ATR-60, 70 BSR-2367, 2376	June 1968	
	Non-Operating	10^{-12} Torr						
	Humidity							
	Operating		Designed to met Humidity Requirements		Ann Arbor, Michigan			No testing planned to 100% level.
	Non-Operating	15 - 100%		BxA		N/A	N/A	
	Vibration		Tested in Stowed Configuration to Design Limit Levels Indicated in Figs. 1-5.					Tested stowed - during design limit test.
	Operating	N/A						
	Non-Operating				Ann Arbor, Michigan		June 1968	
	Launch & Flight	ATR 16 Add 1				TP2334347		
	Lunar Landing	LTA-3 D/R		BxA				
	Acceleration					TP2334343		
	Operating	N/A	Tested to 14±1g 1 min Duration	RMSD	Mishawaka, Indiana	ATR-90, 91 BSR-2412, 2413	July 1968	Tested stowed - during design limit test.
	Non-Operating	ATR 16 Add 1						
	Shock							
	Operating	N/A	Tested to 15±2g 11 ms Sawtooth		Ann Arbor, Michigan	TP2334328 ATR-86, 87	June 1968	Tested stowed - during design limit test
	Non-Operating	ATR 16 Add 1		BxA				
	Salt Spray	N/A						
	Sand & Dust	N/A						
	Fungus	N/A						
	Acoustical Noise	N/A						
	Rain	N/A						
	Radiation	LED-520	130 w/ft^2	BxA	Ann Arbor, Mich	2334335	May 1968	Qual SA Test
	Explosion Proof	N/A						
	PARAMETRIC							
	Functional Performance	Tested as part of integrated system in Space Simulation Chamber		BxA		TP2333032 ATR-60, 70 BSR-2367, 2376	June 1968	Qualified contingent on resolution of FR-132, Digital filter malfunction in LSM
	EMI Performance	Tested as part of integrated system		BxA		TP2333086 ATR-27, 33 BSR-2300, 2320	April 1968	

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Item Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks
		Requirement	Capability	Agent	Location	Document Reference	Date	
Mortar Package Assembly BxA 2334500-5 S/N-3; SN7 Flt. 5 Grenade Launcher Assembly BxA 2338507-2 S/N-2 Thermal Bag BxA 2330803-2 S/N-6 Mortar Box Assembly BxA 2334499-4 S/N-6; SN 8 Flt 5	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	 -300°F to -250°F -65°F to +160°F -300°F to +250°F	 -300°F to +280°F	BxA	Ann Arbor, Mich.	TP 2333026 TP 2337912 TP 2334389 ATR-172 BSR-2588	3/1/69	EMI fixes requalified 10-31-69 with completion of TV TP2341497
	Pressure Operating Non-Operating	10^{-12} Torr SL to 10^{-12} Torr	Tested to 5 x 10^{-6} Torr	BxA	Same	Same as above	3/1/69	Same as above
	Humidity Operating Non-Operating	N/A 15% to 100%	Designed to meet requirements			N/A		No Test Required
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	N/A Refer to NASA TD3/L023/68 B-26/(JAC)	Tested to design Limit Vibration Levels indicated in Figures 1-5	BxA	Same	TP 2334322A ATR-176 BSR-2592	5/21/69	Qual C Array
	Acceleration Operating Non-Operating	N/A 14g - 11 ms	Tested to 14±1g 1 minute duration each axis	BxA	Same	TP 2334323 ATR-176 BSR-2592	5/22/69	Qual C Array
	Shock Operating Non-Operating	N/A 15g - 11 ms	Tested to 15±2g 11 ms sawtooth each axis	BxA	Same	TP 2334324 ATR-176 BSR-2592	5/16/69	Qual C Array
	Salt Spray	N/A						No Test Required
	Sand & Dust	Not defined						No Test Required
	Fungus	N/A						No Test Required
	Acoustical Noise	Not defined						No Test Required
	Rain	N/A						No Test Required
	Radiation	LED-520	130 W/ft^2	BxA	Same		4/23/59	See Operating Temp.
	Explosion Proof	N/A						No Test Required
	PARAMETRIC EMI	AL 770 000	Tested to design requirements	BxA	Same	TP 2333076A ATR-18C BSR-2614	6/10/69	Requalification test of ASE performed per TP2338180 completed 10-19-69
	Functional Performance	ALSEP TM-342	Capable of deployment and operation on Lunar surface	BxA	Same	TP 2333025D ATR 177 BSR-2593	6/3/69	Qualified during Partial Integrated Systems Test in Space Simulation Chamber

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Item Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks
		Requirement	Capability	Agent	Location	Document Reference	Date	
Active Seismic Experiment (ASE) Central Station Electronics BxA 2334772-5 S/N6 Flt 5	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	 -300°F to +250°F -65°F to +250°F -300°F to +250°F	(External SP #1 -300°F to +250°F -4°F to +140°F; ASE mounted in CSE	BxA	Ann Arbor, Mich.	TP 2333026 TP 2337912 TP 2334389 ATR-172 BSR-2588	3/1/69	EMI fixes requal completed 10-31-69 per T/V TP 2341497
	Pressure Operating Non-Operating	 10^{-12} Torr SL to 10^{-12} Torr	Tested to 5×10^{-6} Torr	BxA	Ann Arbor, Mich.	Same as above	3/1/69	Same as above.
	Humidity Operating Non-Operating	 N/A 15% to 100%	Designed to meet requirements			N/A		No Test Required.
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	 N/A Refer to NASA TD3/L023/68-B-26/ (JAC)	Tested to design Limit Vibration Levels indicated in Figures 1-5 & Tables I, II, III	BxA	Ann Arbor, Mich.	TP 2334322A ATR-176 BSR-2592	5/21/69	EMI fixes requalified in vibration per TP 2344948 completed 2/5/70.
	Acceleration Operating Non-Operating	 N/A 14g - x axis	Tested to 14.5g 1 minute duration x axis	BxA	Ann Arbor, Mich.	TP 2334323 ATR-176 BSR-2592	5/22/69	Same as above
	Shock Operating Non-Operating	 N/A 15g - 11 ms	Tested to 15±2g 11 ms sawtooth each axis	BxA	Ann Arbor, Mich.	TP 2334324 ATR-176 BSR-2592	5/16/69	Same as above
	Salt Spray	N/A						No Test Required
	Sand & Dust	Not defined						No Test Required
	Fungus	N/A						No Test Required
	Acoustical Noise	Not defined						No Test Required
	Rain	N/A						No Test Required
	Radiation	LED-520	130 W/ft^2	BxA	Ann Arbor, Mich.	TP 2337912	3/1/69	See Operating Temperature
	Explosion Proof	N/A						No Test Required
	PARAMETRIC EMI	AL-770-000	Tested to design Requirements	BxA	Ann Arbor, Mich.	TP 2333076A ATR-186 BSR-2614	6/10/69	EMI fixes requalified per TP 2338180 and completed 10/19/69.
	Functional Performance	ALSEP TM-342	Capable of start-up and operation on Lunar Surface	BxA	Ann Arbor, Mich	TP 2333025D TP 2333025A	6/3/69 3/1/69	Deployed performance verified by line 1 T/V qual and requal functional tests.
	NOTE 1:	As noted in Section 1.0 on page 5 of ATM 859, the ASE Crystal Filter, Bendix Specification 2340326 remains to be qualified for physical environments, scheduled for completion at McCoy Electronics, 15 May 1970.						

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Note: See comments, paragraph 3.1.1.15 and sections 2.3 and 2.4, and Introduction page 5.

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Item Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks
		Requirement	Capability	Agent	Location	Document Reference	Date	
Geophone Thumper Assembly BxA 2334772-4 S/N-5; SN6 Flt 5	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	 -300°F to +250°F -65°F to +160°F -300°F to +250°F	 -300°F to +280°F	BxA	Ann Arbor, Mich.	TP 2333026 TP 2337912 TP 2334381 ATR-172 BSR-2588	3/1/69	EMI fixes requalified by T/V and functional retest per TP2341497 completed 10-31-69
	Pressure Operating Non-Operating	10-12 Torr SL to 10^{-12} Torr	Tested to 5 x 10^{-6} Torr	BxA	Same	Same as above	3/1/69	Same as above
	Humidity Operating Non-Operating	N/A 15% to 100%	Designed to meet requirements	BxA	Same	N/A	N/A	No Test Required
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	N/A Refer to NASA TD3/L023/68-B-26/(JAC)	Tested to design Limit Vibration Levels indicated in Figures 1-5	BxA	Same	TP 2334322A ATR-176 BSR-2592	5/21/69	EMI fixes requalified in vibration per TP2344948 completed 2-5-70
	Acceleration Operating Non-Operating	N/A 1 g-x axis	Tested to 14±1g 1 minute duration x-Axis	BxA	Same	TP 2334323 ATR-176 BSR-2592	5/22/69	Same as above
	Shock Operating Non-Operating	N/A 15g-11 ms	Tested to 15±2g 11 ms sawtooth each axis	BxA	Same	TP 2334324 ATR-176 BSR-2592	5/16/69	Same as above
	Salt Spray	N/A						No Test Required
	Sand & Dust	Not defined						No Test Required
	Fungus	N/A						No Test Required
	Acoustical Noise	Not defined						No Test Required
	Rain	N/A						No Test Required
	Radiation	LED-520	130 W/ft^2	BxA	Same	TP2337912	3/1/69	See Operating Temp.
	Explosion Proof	N/A						No Test Required
	PARAMETRIC EMI	AL770 000	Tested to design Requirements	BxA	Same	TP 2333076A ATR-186 BSR-2614 ATR-125	6/10/69	EMI fixes requalified per TP2338780 and completed 10-19-69
	Functional Performance	ALSEP TM-342	Capable of deployment and operation on Lunar Surface	BxA	Same	TP2333025D TP2333025A	6/3/69 3/1/69	Qualified during Partial Integrated Systems Test in Space Simulation Chamber and requal

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Note: See comments, paragraph 3.1.3.5, and section 2.3 .

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Item Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks
		Requirement	Capability	Agent	Location	Document Reference	Date	
Subpackage #2 BxA 2339100-1 S/N 17, Flight 5 Array D Qual 2339100-2 S/N 16	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	-300°F to +250°F -65°F to +160°F -300°F to 250°F	-300°F to +270°F (See note 1) -300°F to +250°F	BxA	Ann Arbor, Michigan	TP2334335(ENV) TP2333032(IST) ATR-60, 70 BSR-2367, 2376	6/10/68	Qualified in Qual SA test program
	Pressure Operating Non-Operating	10^{-12} Torr SL to 10^{-12} Torr	Tested to $5x10^{-6}$ Torr	BxA	Ann Arbor, Michigan	Same as above	6/10/68	Test level limited by test equipment capabilities.
	Humidity Operating Non-Operating	N/A 15-100%	Designed to Meet Humidity Requirement	BxA	Ann Arbor, Michigan	N/A	N/A	
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	N/A Refer to CP 100001	Tested in Stowed Configuration to Design Limit Levels Indicated in Figures 1-5	BxA	Ann Arbor, Michigan	TP2347062 TP2346328	2 Feb 1971	See first remark See Note Below
	Acceleration Operating Non-Operating	N/A	Tested to 14± 1g each axis	BxA	Ann Arbor, Michigan	TP2334330 ATR-92, 93	7/6/68	See first remark
	Shock Operating Non-Operating	N/A AER312-313	Test to 15 ± 2g each axis	BxA	Ann Arbor, Michigan	TP2346329A BSR 3014	4 Feb 1971	
	Salt Spray	N/A						No Test Required
	Sand & Dust	Not Defined						No Test Required
	Fungus	N/A						No Test Required
	Acoustical Noise	Not Defined						No Test Required
	Rain	N/A						No Test Required
	Radiation	LED-520	130 w/ft^2 I.R.	BxA	Ann, Arbor	See first item above		See first remark
	Explosion Proof	N/A			Michigan			No Test Required
	PARAMETRIC Functional Performance	Tested as part of an integrated system in space simulation chamber	Capable of Deployment and operation on Lunar Surface	BxA	Ann Arbor, Michigan	See first item above		See first remark
	NOTE: ALSEP SP #2 with HFE S/N-2 subsequently requalified for physical environments per the Array D SP #2 Test Plan, TM 598, Rev B. Qualification Minutes, BxA No. 9703B-26 dated 19 February 1971, QAR Board Meeting ruled that the Array D SP #2 configuration was qualified contingent on satisfactory closeout of action items.							

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SUBPACKAGE II, RTG ASSEMBLY

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Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks
		Requirement	Capability	Agent	Location	Document Reference	Date	
Radioisotope Thermoelectric Generator (R. T. G.) G. E. [illegible] 00779 Mod. 2 S. N. [illegible] Flight [illegible] Fuel [illegible] 47 Dec. [illegible] 0001, S. N. [illegible] Flight SA Qual. Mod. 3	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	1000°F to 1140°F -380°F to 440°F	1170° F 500°F	BxA	Ann Arbor, Michigan	TP 2334335 ATR-60 BSR-2387	May-June 1968	Qualification at assembly level was performed by G. E. Refer to test reports ANSQ Doc. No. 6300-281, ANSQ Doc. No. 6300-288
Pressure Operating Non-Operating	Sea Level to $1x10^{-12}$ torr	$5x10^{-5}$ torr $16x10^{-8}$ toor	BxA	Ann Arbor, Michigan	↓	↓	Test level limited by test equipment capability	
Humidity Operating Non-Operating	15 to 100%	Designed to meet humidity requirements	N/A	N/A	N/A	N/A	No testing required	
Vibration Operating Non-Operating Launch & Flight Lunar Landing	ATR-16 Addendum 1	Refer to Table 1	General Electric Valley Forge Technology Center Philadelphia, Pa.	General Electric	GE Doc. #6300 Doc. #6300-288	Jan 1968	Qualified at Subpackage #2 Design limit level in the stowed configuration, Qual SA Refer to ATR-84, 85	
Acceleration Operating Non-Operating	ATR-16 Addendum 1	7. SG 3 to 4 min each axis	BxA	Ann Arbor, Michigan	TP 2334330 ATR-92, 93	June 1968	Successfully Tested, Qual SA	
Shock Operating Non-Operating	ATR-16 Addendum 1	15 G each axis 11 msec± 10%	BxA	↓	TP 2334331 ATR-88, 89 BSR-2408, 2409	June 1968	" "	
Salt Spray	N/A	N/A	N/A	N/A	N/A			
Sand & Dust	NYD	G. E.	Phil. Penn.	NYD	NYD			
Fungus	N/A	N/A	N/A	N/A	N/A			
Acoustical Noise	NYD	NYD	G. E.	Phil. Penn.	NYD			
Rain	N/A	N/A	N/A	N/A	N/A			
Radiation	NYD	NYD	G. E.	Phil. Penn.	NYD		See line 1	
Explosion Proof	NYD	NYD	G. E.	Phil. Penn.	NYD			
PARAMETRIC								

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QUALIFICATION STATUS LIST-ALSEP PROGRAM SUBPACKAGE II, RTG SHORTING PLUG

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Analyst	Page ___ of ___ Pages	

Item Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks
		Requirement	Capability	Agent	Location	Document Reference	Date	
RTG Shorting Plug Assy BxA 2338017, S/N 8 Flight 5 See Note 1. SA Qual 2335520, S/N 1	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	 -300°F to +50°F -60°F to +160°F	 -300°F to +250°F -60°F to +160°F	Bendix Aerospace System	Ann Arbor Michigan	TP2334335 TP2333032 ATR-60, 70 BSR-2367, 2376	June 1968	Successfully tested on Qual SA model.
	Pressure Operating Non-Operating	$1x10^{-12}$ Toors SL to $1x10^{-12}$	Tested to $5x10^{-6}$ Torrs					Capability limited by test Equipment Capability
	Humidity Operating Non-Operating	N/A	Designed to meet Humidity Requirements		N/A	N/A	N/A	No testing required
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	N/A Refer to Fig. 1-5	Tested in stowed configuration to Design Limit levels indicated by Fig. 1-5		Ann Arbor Michigan	TP2334348 ATR-84, 85 BSR-2404, 2405	July 1968	Successfully Tested, Qual SA
	Acceleration Operating Non-Operating	N/A LTA-3D/R	Tested to 14 ± 1g 1 min duration 5 times @ axis			TP2334330 ATR-92, 93	June 1968	" "
	Shock Operating Non-Operating	N/A LTA-3D/R	Tested to 15 ± 2g 11 ms sawtooth 5 times @ axis.			TP2334331 ATR-88, 89 BSR-2408, 2409	June 1968	" "
	Salt Spray	N/A						
	Sand & Dust	Not Defined						
	Fungus	N/A						
	Acoustical Noise	Not Defined						
	Rain	N/A						
	Radiation	Not Defined	IR 130W/ft^2					
	Explosion Proof	N/A						
	PARAMETRIC							
		Note 1: Qualified on Qual SA configuration as BxA 2335520 Assembly Revision C which is identical to BxA 2338017 Assembly used on Array B and C						

QUALIFICATION STATUS LIST-ALSEP PROGRAM

SUBPACKAGE #2, APOLLO LUNAR HANDLING TOOL (ALHT)

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Analyst JTS	Page ____ of ____ Pages	

Item Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks
		Requirement	Capability	Agent	Location	Document Reference	Date	
ALHT SEB39101165, S/N 1005, Flight 2-A SA Qual, S/N 2	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon							See Notes Below
	Pressure Operating Non-Operating							
	Humidity Operating Non-Operating							
	Vibration Operating Non-Operating Launch & Flight Lunar Landing							
	Acceleration Operating Non-Operating							
	Shock Operating Non-Operating							
	Salt Spray							
	Sand & Dust							
	Fungus							
	Acoustical Noise							
	Rain							
	Radiation							
	Explosion Proof							
	PARAMETRIC Note 1: The ALHT mass simulator rather than a flight configuration model was used for the BxA Qual SB system level dynamic tests. Note 2: Refer to SP#2 QSL Sheet for shock, vibration and acceleration environment levels which apply to the interface qualification.							

QUALIFICATION STATUS LIST-ALSEP PROGRAM PASSIVE SEISMIC EXPERIMENT

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Item Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks
		Requirement	Capability	Agent	Location	Document Reference	Date	
PSE Leveling Stool Assembly P/N 233400 BxA #2344723, S/N 3 Flight 5 SA Qual 2335945 S/N 1	ENVIRONMENTAL							
	Temperature:							
	Operating	107°F to 125°F	Tested in Space Simulation Chamber for Temperature	Bendix Aerospace Systems Division	Ann Arbor, Michigan	TP2334335 ATR-60, 70 BSR-2367 2376	May-June 1968	Qualification Accomplished at the System Level, QSA
	Non-Operating	-65°F to 160°F						
	Earth	Same as Operating						
	Moon							
	Pressure							
	Operating	1×10^{-12}mm Hg	Verified to 5×10^{-5}Torrs in Space Sim. Cham					
	Non-Operating	1×10^{-8}mm Hg						
	Humidity							
	Operating	Not Applicable	Designed to Meet Humidity Requirements			N/A	N/A	
	Non-Operating							
	Vibration							
	Operating	Not Applicable	Tested in Stowed Configuration to Vibration Design Limits Indicated in Figs. 1 Thru 5			TP2334348 ATR-84, 85 BSR-2404, 2405	July-Aug 1968	
	Non-Operating	Refer to ATR-16 Addendum 1						
	Launch & Flight							
	Lunar Landing							
	Acceleration							
	Operating	Not Applicable	Test in Stowed Configuration to 14± 1g 1 Min.			TP2334330 ATR-92, 93	7/4/68	
	Non-Operating							
	Shock							
	Operating	Not Applicable ATR-16-Add 1	Tested in Stowed Configuration to 15± 2g 11ms 3 Times Ea Axis			TP2334331 ATR-88, 89 BSR-2408, 2409	6/24/68	
	Non-Operating							
	Salt Spray	Not Applicable	Not Applicable					
	Sand & Dust	LED-520	Designed to Meet					
	Fungus	Not Applicable	Not Applicable					
	Acoustical Noise	Not Applicable	Not Applicable					
	Rain	Not Applicable	Not Applicable					
	Radiation	LED-520	Designed to Meet					
	Explosion Proof	Not Applicable	Not Applicable					
	PARAMETRIC							

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QUALIFICATION STATUS LIST-ALSEP PROGRAM HEAT FLOW EXPERIMENT

Date 9/30/71	No. ATM-1052	Rev. No.
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Item Nomenclature	Environment and/or Parameter	Stress Level		Verification of Stress Level Capability				Remarks
		Requirement	Capability	Agent	Location	Document Reference	Date	
Heat Flow Experiment 2345430-101, S/N 4 Flight 5	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	 -300°F to +250°F -65°F to +160°F -300°F to +250°F	 -300°F to +250°F Not Tested	BxA	Ann Arbor, Michigan	TP2334387 ATR-160 BSR-2570	Dec 1968	Qual SB Test
	Pressure Operating Non-Operating	Sea Level to 10^{-12} TORR	5×10^{-7} TORR	BxA	Ann Arbor, Michigan	TP2334387 ATR-160 BSR-2570	Dec 1968	BxA facilities will not allow testing to below 5 x 10 TORR
SD Qual 2345430-101, S/N 2 Flt 3	Humidity Operating Non-Operating	15 to 100%	Designed to Meet Humidity Requirement	BxA	Ann Arbor, Michigan	N/A	N/A	No test required
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	N/A LTA-3D/R LTA-3D/R	Tested without failure to levels shown in figures 1-5 SB, 1, 3, 4, 5, 6 Array D	BxA	Ann Arbor, Michigan	TP2337905 ATR-149 BSR-2546	Dec 1968	Qual SB Design Limit Test Array D - See Note 1 & 2
	Acceleration Operating Non-Operating	N/A ATR-16 ADD. 1	14g ±1g/1 min.	BxA/BMSD	Mishawauka Indiana	TP2337915 ATR-164 BSR-2574	Dec 1968	Qual SB Design Limit Test
	Shock Operating Non-Operating	N/A 15g±2g Sawtooth	15±2g Sawtooth	BxA	Ann Arbor, Michigan	TP2337917 ATR-161 BSR-2571	Jan 1969	Qual SB Design Array D - See Note 1 & 2
	Salt Spray	N/A						
	Sand & Dust	N/A						
	Fungus	N/A						
	Acoustical Noise	N/A						
	Rain	N/A						
	Radiation	N/A						
	Explosion Proof	N/A						
	PARAMETRIC functional performance	Tested as part system in the chamber	of integrated Space Simulation	BxA	Ann Arbor, Michigan	TP2338640 (Mod. IST) ATR-163 BSR-2573	Jan 1969	Qual SB Test
		Note 1: S/N 02 subsequently requalified on SP#2 as noted in Array D Qualification Assessment Review Board Minutes 9703B-26 dated 19 February 1971. TP 2346328 is the document covering the Design Limit Vibration testing for SP#2 Array D, and TP 2346329 is the document covering the Shock requirements of SP#2, Array D. Note 2: Design limit (x, y, z) with the S.N-2 HFE on Array D SP#2 were performed January 1971 at the following levels: a. ~~Sine (3 Oct/min, 5-100-5 Hz) - Duration 8.50 min.~~ b. L & B random (1.0 min) 3.00 min. c. Lunar descent random (12.5 min) 37.50 min. d. Shock (15) 0.05 min.					

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